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Users Not Ready for High-Tech Nets

By Marcia Blumenthal
CW Staff

WALTHAM, Mass. — The vast majority of users do not seem to be ready for state-of-the-art data communications networks.

A telling point is that while user demand for IBM's Synchronous Data Link Control (SDLC) protocol nearly doubled during the past two years, this demand "in part represented users' desire for bit-oriented architecture rather than its actual implementation," according to a recent report from International Data Corp. (IDC) entitled "User Requirements for Network Development."

Moreover, despite much talk of methods combining voice and data transmission, only 12% of the 317 users polled by IDC currently use the technique. And survey respondents not yet using combined voice and data transmission methods indicated they will not be changing their mode of transmission in the foreseeable future.

In examining users' current and projected modes of network development, IDC found to its surprise that minicomputers are the single class of processors employed most frequently by users. Of the 626 CPUs used as hosts to 389 networks, 45% of the processors fell into two categories of high-end units — classes six and seven as defined by IDC (IBM 370/155 and above and the 30 series) — but 28% of those networks were hosted by minicomputers.

Based on this information, IDC found it highly probable that minicomputer makers with well-defined data com-

(Continued on Page 6)

• Series/1 X.25 Offered Since '80

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — IBM has been offering an X.25 interface in the U.S. to its Series/1 minicomputer customers since the fourth quarter of 1980, a company official reported last week.

(Continued on Page 4)

• Xerox Kills Xten Project

By Brad Schultz
CW Staff

STAMFORD, Conn. — Xten is out of business.

Claiming that the concept is technically feasible but the economics are not, Xerox Corp. abandoned its plans for Xerox Tele-

(Continued on Page 10)

NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Vol. XV, No. 21 May 25, 1981 $1.25 a copy; $36/year

Sandra Kurtzig

Woman Entrepreneur Writes Success Formula

By Rita Shoor
CW Staff

LOS ALTOS, Calif. — Take a degree in aeronautical engineering from Stanford University. Combine it with a willingness to work 20-hour days and a firm commitment to corporate survival. Season the mixture with some $2,000 worth of start-up capital and make sure you have the ability to recognize an emerging market *before* potential competitors can gain a foothold.

That was the formula followed by 34-year-old Sandra Kurtzig when she began ASK Computer Systems, Inc. here. And if $13 million in estimated sales for the fiscal year ending in June 1981 is any measure of success for a seven-year-old firm, the female entrepreneur's formula has definitely worked.

Kurtzig's introduction to computer systems began with summer jobs at UCLA's computer center and part-time work in fluid physics for TRW Communications Systems and Services. After obtaining her graduate degree, she moved across the country and worked in what is now General Electric Co.'s Information Systems Business Division as a district marketing specialist for New Jersey.

The combination of general

(Continued on Page 8)

Budgets Bullish

User Spending to Rise 20%

By Ann Dooley
CW Staff

FRAMINGHAM, Mass. — The economy may be bearish, but DP users are bullish on spending. They spent a hefty 17% more in 1980 than they did in 1979, and this year they will spend 20% more than last year.

Those figures come from International Data Corp.'s (IDC) Information Industry & Technology Service, which explained in a preliminary report entitled "1981 IDC User Spending Forecast" that the bullish spending figures are probably the result of a milder than anticipated recession and continued high inflation.

The report is based on data gathered from 250 central DP facility users on their actual 1979 and 1980 spending and their projected 1981 spending plans.

User Trends

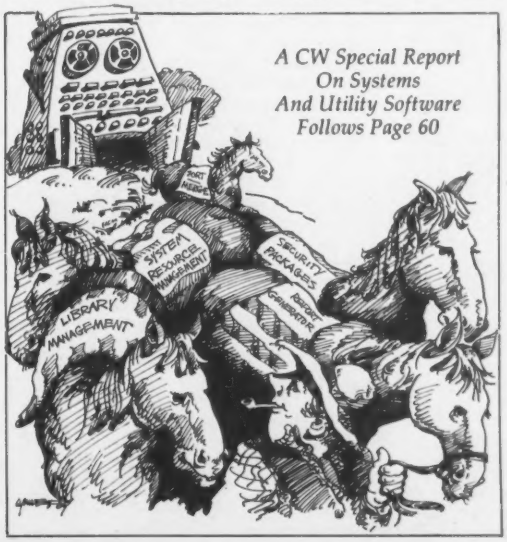
Among the evident trends:

• Users will spend increasing amounts for hardware. Through the 1970s, hardware spending remained at a fairly constant 35% of the total user DP budget, dropping to 33% in 1980. This year, hardware is expected to account for 34% of users' budgets; IDC attributed the increase largely to pent-up demand.

• Overall hardware spending will increase 22% in 1981. While users were wary last year about making major hardware purchases because of both the gloomy economic forecast and their uncertainty over IBM's H series, doubt over both these factors has been largely alleviated, IDC noted.

Additionally, users believe

(Continued on Page 4)



A CW Special Report On Systems And Utility Software Follows Page 60

Matching Wits With CPUs Seen Threat

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — One convict had plotted to penetrate an air traffic control system and "play Star Wars with real airplanes."

Another inmate had planned to recompute the Dow Jones stock market average, and a third prisoner had hatched a scheme to bring down a Communications Satellite Corp. satellite.

The federal minimum-secu-

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Compatible With Telidon, Antiope

AT&T Unwraps Videotex Protocol

By Phil Hirsch
CW Washington Bureau

TORONTO — AT&T unveiled here last week a videotex display protocol that is compatible with Canada's Telidon and France's Antiope systems, but incompatible with Prestel, the British system that launched the videotex services industry.

One likely result of AT&T's introduction, which was made here on the opening day of the international Videotex '81 conference, is that the Canadians and French have now gained an edge over the British in the three-way battle for primacy in the U.S. market.

However, the advantage is unlikely to last: The British have already worked out a standardized protocol with the French and Germans which will make Prestel less incompatible with the new AT&T scheme.

Remaining differences almost certainly will be addressed immediately, since the British clearly do not want to be excluded from what is generally agreed to be potentially the most lucrative market for videotex/teletext services, hardware and software.

And since it will take at least a year to design and produce the integrated circuit chips implementing AT&T's presentation-level protocol, according to a phone company spokesman, the British still have some time to jump aboard the AT&T bandwagon.

International Standard

Thus, although the protocol promotes a particular display coding system, the more significant result of AT&T's announcement will probably be to accelerate development of an international standard embracing the French, Canadian and British technologies.

It also seems likely to promote lower videotex terminal prices, additional applications and a much larger market.

Sam Berkman, manager of AT&T's Information Management Division, alluded to this when he announced the new protocol here.

Since a significant mass of information is required for a videotex system to be of value to a consumer, "there would probably be only limited market penetration if each system required its own unique terminal," Berkman said. And with "that limited penetration, there would be insignificant revenues to support comprehensive and sophisticated data bases."

Key features of Bell's new protocol include:

- Accommodation of both 7-bit and 8-bit coding.
- Dynamically redefinable character sets.
- Continuous scaling of text size.
- Macro picture description instructions.
- Simple animation.

IBM Discounts 5280 and 5220

ATLANTA — IBM's General Systems Division has announced volume purchase discounts on its 5280 Distributed Data System and 5220 Administrative System.

The discounts, which range from 6% to 15%, depending on quantities shipped in either a 12- or 24-month period, go into effect immediately, a spokesman said.

IBM-licensed programs, education, maintenance agreements, customer engineering, systems engineering services and accessories are not affected by the announcement, according to IBM.

Beware, CW Subscribers!

If you're a *Computerworld* subscriber in the Midwest or Northeast, you may have been plagued recently by phone calls from persons claiming to represent CW. These callers offer free CW subscriptions in exchange for the names of your programmers and analysts. When asked to leave a name and telephone number, they give the name of a CW editor and our phone number or a fictitious name and number.

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REPORTER: Mr. President! Are there any reasons for this name change that weren't covered in your prepared statement?

PRESIDENT: No, it's all there. As I mentioned SyncSort has become the best-known sort in the world. It's now used by 69% of America's major data processors, according to the latest IDC survey. Then, too, the name SyncSort has become synonymous with leadership in sorting technology. These are powerful recognition factors. We couldn't see any reason to go on calling our products by one name and our company by another. It's as simple as that. Yes, the lady on my left.

REPORTER: I seem to recall that you received a patent on SyncSort. Am I correct in that?

PRESIDENT: Yes, last July we received a U.S. Patent on many of the "novel sorting innovations" we've made over the years. These are now embodied in SyncSort, and they make it possible for the user to do his sorting work for the fewest possible computer resources. Incidentally, these innovations underlie all modern, efficient sorting. Without them, you'd be back in the stone age. Yes, sir.

REPORTER: Is performance the only reason for SyncSort's popularity?

PRESIDENT: Not by any means. Two other reasons are becoming increasingly important. One is that buzzword productivity. As the industry has become more "programmer-bound," we've built in a host of labor-saving features that reduce programmer time for common non-sorting functions. The second reason for SyncSort's success is simply customer service. No matter how well you design a sort program, the wide range of user requirements makes it imperative that you provide fast, accurate sorting advice. I'm particularly proud that 85% of all customer requests for technical service are now resolved within 24 hours. Yes, ma'am.

REPORTER: Then if I understand you, this name change doesn't signal any great change in your method of operation. It's simply a way of reminding the public of what made you famous.

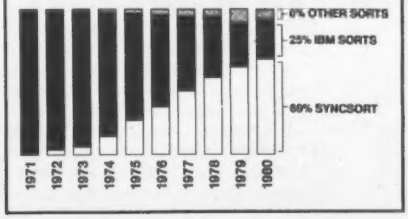
PRESIDENT: Exactly. We're like a man named George Herman Ruth who decides to change his name legally to Babe.

REPORTER: Well, at the risk of sounding churlish, I'll remind you that Babe Ruth wasn't a software company. He was a homerun hitter.

PRESIDENT: So is SyncSort. Thank you ladies and gentlemen. Now if you'd care to join us for refreshments...

Chart of the Month:

Growth of SyncSort OS users



syncsort INC.

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Survey: Users Displaying Bullish Spending Patterns

(Continued from Page 1)

that the most cost-effective way to meet increased demands for productivity is to install more new, improved equipment, the research firm said.

• Rental and lease payments to manufacturers grew 10% in 1980, a significant part of which resulted from the regular inflationary increases in lease prices. This year's 23% increase is another story, however, according to IDC, which noted that the substantial increase indicates that users will be acquiring additional equipment.

• Third-party lessors will see similar benefits in increased demand from users. Depreciation charges from 1980 purchases will show up in 1981, the survey showed. And capital expenditures for expensed purchases — an area that varies significantly from one year to the next — increased 30% in 1980 for purchases excluding those depreciated; that figure is estimated to be as high as 80% in 1981.

• The rate of growth in data entry equipment will slow from 22% in 1980 to 16% in 1981 because expenses for terminal and remote equipment are increasingly being picked up by the equipment's actual users. The figures for this category are difficult to determine precisely, IDC cautioned, since many respondents tend to include their spending for this item in one or more of the other hardware categories.

• Software and services will continue to be the fastest growing area of expenses in 1981. Although comprising only a small part of most users' budgets (6.4% on the average), it is expected to grow this year at a rate of 25%.

Spending for off-the-shelf software packages will increase by as much as 34% in 1981, IDC forecast. Users are finding it less expensive, less risky and more cost-effective to buy proven software, rather than writing their own, in order to keep up with growing demand, the researchers reported.

Custom Software

Custom software and consulting — another area typically subject to large variations from one year to the next — will grow 20% this year compared with 22% last year.

Although about half of the purchases in this category will be made by government installations (which are increasing their purchases as a means of counteracting the freeze on federal equipment acquisition), private-sector users are moving away from custom software to less expensive and more reliable packaged software, a move that will result in a slowed growth rate, according to IDC.

In other areas of software, expenditures for keypunch, optical character recognition (OCR) and computer output microfilm (COM) services will increase by 28% this year.

COM usage is on the upswing because of the increasing demand for archival storage, the ease of information retrieval with COM and as a means of substitution for expensive paper products, IDC noted.

Users are also targeting the area of time-sharing and remote job entry as one place to cut expenses because they are increasing their on-site hardware purchases.

• Although salaries and related expenses comprise 46.9% of users' total DP budgets, staff-related expenses have not increased as a percentage of the total DP budget over the past decade.

In addition, DP staff size has not grown very fast in the last few years, partially because of the small growth in data entry and clerical personnel.

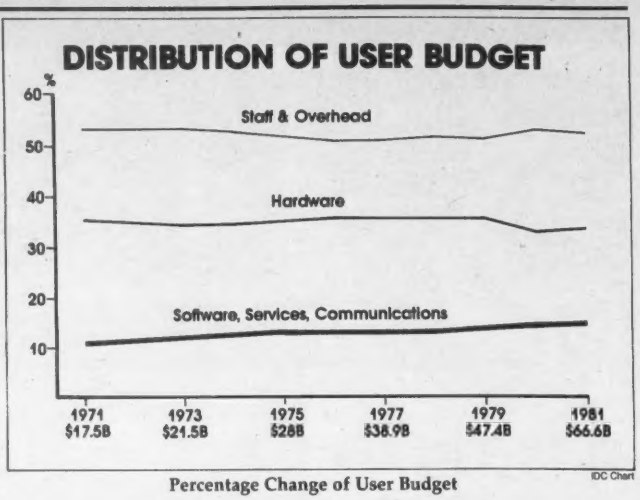
Salaries will see a 19% growth rate this year compared with 22% last year, according to IDC figures.

• Data communications expenses will grow 21% this year, outpacing last year's growth rate of 15%. This category comprises 3.2% of total DP expenses, with communications line costs being generally one of the consistant strong growth items.

• Users will spend 4.5% of their overall budgets for supplies, with an expected growth rate of 16%, which is also the same as last year's rate of increase.

The final "1981 IDC User Spending Forecast" will be available in June. The price of the report was unavailable.

IDC is at 5 Speen St., P.O. Box 955, Framingham, Mass. 01701.



Percentage Change of User Budget

IBM Says X.25 Link Offered Last Year

(Continued from Page 1)

Among other applications, the new interface allows the Series/1 to act as a gateway between Systems Network Architecture (SNA) systems and public X.25-based data networks, according to Bill Bozarth, an IBM Series/1 product administrator.

GTE/Telenet Communication Corp. recently became the first public-packet network operator in this country to certify the IBM interface. Tymnet, Inc., which operates a competing network, reportedly is not far behind.

The new interface, Bozarth said, consists of a software package and two circuit cards. The software, which IBM refers to as packet-network support (code number 5799-TCP-PRPQ P1008), can be purchased outright for $2,500 or leased for $45 per month. (Standard IBM software leasing terms apply, Bozarth said.) Each of the circuit cards (RPQ 8T1067) contains a microprocessor-based data link control (DLC) adapter, which supports half-duplex communication between a Series/1 processor and an X.25-based network at speeds up to 19.2K bit/sec. Each adapter card costs $1,785.

Both adapter cards fit into the back of the Series/1 mainframe, while the software resides in the Series/1 memory partition that holds the operating system. The new interface, Bozarth said, works only with those Series/1 minis that utilize the Real-time Programming System, Versions 4 or 5. The former occupies 64K bytes, the latter 128K bytes of memory. Adding packet-network support may require additional memory, he added, depending on the extent to which existing data storage is already being utilized.

The new interface "allows Series/1 to communicate with other intelligent terminals or processors in a point-to-point configuration where X.25 Level 2 is used as the link access protocol (LAP)," IBM said in a marketing release it distributed in-house late last year.

Equipped with packet-network support hardware and software, a Series/1 can be used as a concentrator, front-end processor or message-switching device, the company added.

The hardware portion of the interface — the two circuit cards comprising the DLC adapter — uses the ISO high-level DLC frame structure. Its physical interface conforms to the EIA RS-232C standard.

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Real Cause of False Alerts?

GAO Slams Management of Norad Systems

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Congressional investigators last week blamed a string of computer-related false alerts generated by the North American Air Defense Command (Norad) on inadequate systems planning and management.

The alarms that sent defensive forces into a heightened state of readiness last June 3 were ultimately attributed to a faulty chip in a communications multiplexer, but Milton J. Socolar, the acting head of the General Accounting Office (GAO), said the problems go much deeper.

Addressing a House Government Operations subcommittee recently, Socolar said Defense Department insistence that Norad use standard system components of the much-maligned Worldwide Military Command and Control System (Wimmex) led to developmental delays at Norad and, in the end, to an early warning system with inadequate hardware and software.

Detailing findings of a just-completed GAO study of the Norad system failures, Socolar said difficulties in making the standard Wimmex hardware and software perform in the Norad real-time, on-line environment are the major factors behind the system's inadequacy.

Inadequate Gear

The most damning information GAO produced was that Norad had concluded early in the systems development stage that the computers planned for Wimmex — primarily Honeywell, Inc. general-purpose machines — would not be adequate for Norad requirements. Despite Norad complaints to the Joint Chiefs of Staff and despite GAO warnings, the Defense Department forced Norad to adopt the Wimmex hardware and software.

In the end, Socolar said, Norad had to lower its mission objectives and system specifications to certify the Wimmex equipment as acceptable.

The Defense Department has failed to take effective remedial action "despite continued warnings," Socolar charged. He added that "serious problems still exist because of inherent weaknesses in the Norad computer systems, and they will remain until positive management action is taken at the highest levels of the Defense Department."

However, he said, corrective steps under way at Norad, including an interim upgrade of communications processing capabilities, "have substantially removed any element of time criticality."

Many of the Norad problems have been identified and are being addressed, Socolar and Norad Commander-in-Chief Lt. Gen. James V. Hartinger agreed. But Socolar said replacement of the Norad computer systems should be given the highest priority by the Pentagon.

"The Norad situation is very close to critical," Socolar said. "The systems must be replaced."

Last week's hearings were called by Rep. Jack Brooks (D-Texas), Government Operations Committee chairman, to see if the notoriously lengthy federal DP acquisition process contributed to the Norad systems development problems.

A report prepared for the Senate Armed Services Committee last fall on the Norad computer failures suggested the acquisition regulations severely hindered Norad attempts to procure state-of-the-art equipment [CW, Nov. 10].

Based in part on those findings, the Defense Department has been lobbying Congress for an exemption from the procurement requirements spelled out in the Brooks Act, the 1965 law that regulates government DP acquisitions.

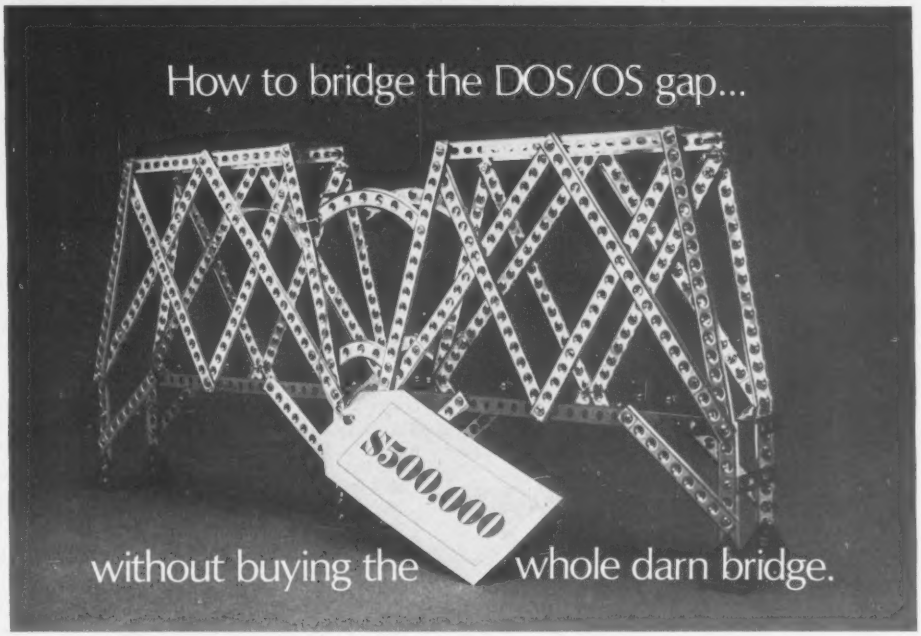
Socolar assured Brooks the GAO found no evidence to indicate such an exemption would clear up the Norad and Wimmex problems. The solution, Socolar said, is less fragmented procurement oversight within Defense and better systems management.

Implementation Errors

According to the GAO report, "our analysis ... shows that time delays experienced in the [Norad systems] program have occurred basically in the implementation phase rather than acquisition phase. We found no documentation supporting any relationship to the acquisition process."

GAO concluded that "these [false alerts] were related to operational procedures errors and insufficient software checks on outgoing missile warning messages. For this reason," the agency said, "we concluded that the acquisition process had nothing to do with errors resulting from faulty procedures and software programming."

Because of the corrective steps Norad is taking that "have substantially removed any element of time criticality," Norad should not be exempt from existing acquisition laws and regulations, according to the GAO.



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Most Users Found Unready For State-of-Art Networks

(Continued from Page 1)

munications products are making inroads into a domain largely assumed to belong to mainframers.

Some 48% of the high-end CPUs were identified as IBM units and 11% of the minicomputer systems were identified as Digital Equipment Corp. processors. Whatever the configuration used, IDC found 88% of those surveyed used single vendors for the hosts on their networks.

Nearly two-thirds of the users responding to the survey said their data communications budgets represent less than 10% of their DP budgets, but of these users the largest group (25%) said data communications consume between 5% and 10% of their budgets.

In 1979, IDC found the average value of an installed network was $750,000; the average value for 1981 is $963,000; by 1985 the value of the average network will be $1.63 million. The total value of networks installed in 1979 was $7.4 billion; IDC forecast that by 1985 that value will climb to $24.7 billion (see chart).

These users surveyed by IDC reported an average 1.8 networks operating within each of their companies, but told the market research firm that they expect the average number of networks to rise to 2.3 by the end of this year.

Popular Applications

Each of the networks in place at the surveyed user sites handles an average of 3.22 applications, but users predicted that number will rise to 3.58 by the end of the year. The most popular applications are data entry, file maintenance, financial and accounting.

While these applications will remain relatively stable in the foreseeable future, users most frequently cited text editing as the application that would be added to the networks. That application showed a 50% increase in the frequency of mention, IDC said.

Rapid Growth

Although the number of applications is growing relatively slowly, the number of personnel performing these and other applications appears to be growing rapidly, according to IDC's projections on the number of terminals to be used on these networks.

By the end of this year, IDC projected, 108,000 terminals will be operating on these networks, some 17% more than two years ago.

Nearly two-thirds of the surveyed networks use long-distance transmission, with 96% of those transmissions sent over common carrier lines. Users said that by the end of this year 90% of the transmissions will be made via common carriers, another manifestation that users are not flocking to specialized carriers or value-added networks.

The full survey report can be obtained for $995, but is offered free as part of IDC's Corporate Planning Service. IDC is located at 5 Speen St., Box 955, Framingham, Mass. 01701.

People Trying to Outwit CPUs Called 'Tremendous Threat'

(Continued from Page 1)

rity prison at Lompoc, Calif., houses a sizable number of convicted computer criminals, many of whose crimes were motivated more by the desire for intellectual challenge than by the promise of financial reward.

People who feel compelled to match wits with sophisticated computer security systems have brought the industry face to face with a "tremendous threat," according to Susan Nycum, a partner in the Boston-based law firm of Gaston Snow and Ely Bartlett.

Nycum, an authority on computer abuse and on the law governing the protection of confidential programs, cited the recent example of a 15-year-old school child who is accused of stealing all the proprietary software belonging to one of the industry's major hardware vendors.

Vendor Aware?

The theft apparently occurred so recently that the unidentified vendor may not even be aware yet that the security of its software has been breached, Nycum said here at the second annual Computer Law Institute sponsored by the University of Southern California Law Center.

Many of the culprits who perpetrate computer crimes to test their intellectual prowess come from the industry's microcomputer ranks rather than from the large-mainframe sector.

But Nycum, who works out of her company's Palo Alto, Calif., office, expressed the hope that as the relatively young microcomputer field grows in maturity and discipline its involvement in security and privacy abuses will steadily slacken.

Yours Is Mine

In other remarks during the recent conference, Nycum characterized software piracy as a serious industry problem and likened today's computer field to the early days of the phonograph business when unauthorized duplication and sale of records was rife.

The prevailing attitude toward software ownership and property rights seems to be, "What's mine is mine, and what's yours is mine, too," she explained.

The reason for the prevalence of the software piracy problem is not entirely clear. At least some of the industry's software pirates may be committing illegal or unethical acts without even realizing it, Nycum said.

"I suppose in their secret heart of hearts they probably know that what they're doing isn't entirely right, but they may not be aware that they're breaking the law," she added.

FCC Allows 30% Hike in Wats Rates June 1

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — A new Wide Area Telecommunications Service (Wats) tariff, charging some users sharply higher rates for calls made during normal business hours, but offering hefty discounts for usage at other times, will become effective June 1, the Federal Communications Commission (FCC) has decided. However, numerous Wats users are expected to go to court in an attempt to defer the effective date.

If that tactic fails, daytime Wats rates for heavy users of the service will rise 30%, and in some cases as much as 85%, according to estimates made by their attorneys. An additional 16% increase is scheduled to take effect by July 9 [CW, May 18].

For those Wats users who need less than 80 hours of daytime service per month, the June 1 rates, in many cases, will be less than what they are paying now. But these savings will be largely, if not completely, erased when the 16% second-round increase occurs.

Illusory Saving

For all Wats users, the discounts for usage during nonbusiness hours offer a possible way of reducing costs. But in many cases it is an illusory saving because Wats is frequently used to communicate with customers, thus the calls have to be made during regular working hours.

Some of those who object to AT&T's new tariff want the phone company to offer discounts during relatively slack communications periods of the business day. But the FCC has rejected this scheme, at least for now.

In accepting AT&T's alternate scheme on May 15, the commission indicated it will reconsider the question of rate discounts within the business day after June 1. The AT&T tariff, the commissioners added, is only a "first step" toward resolution of the years-long Wats controversy.

One of the underlying reasons for revising Wats rates is the FCC's conclusion, in a number of previous proceedings, that earlier rates discriminated unfairly against smaller volume users and favored those with heavier traffic requirements. This is because the latter received usage-based discounts that cut their circuit charges per hour way below the rates paid by smaller volume users.

To help overcome this bias, the commission required AT&T to allow the resale of Wats circuits by other carriers and sharing of the facilities by user groups. The new tariff, however, will allow relatively little sharing/resale.

Reduced Opportunity

Basically, this is because a reseller/sharer has to price his service below AT&T's lowest comparable rate, meanwhile paying the heaviest usage rates for the facilities leased from the phone company. Because the new tariff raises the latter rates substantially, it reduces the opportunity for suppliers other than AT&T to provide Wats.

Among the users planning to take the new Wats tariff to court is Aeronautical Radio, Inc. (Arinc), a user group composed of the nation's major airlines. An Arinc attorney reported that if the increase is implemented it will raise costs 30% to 40% for the association's members.

"Rates are likely to go up another 16% on top of that in July, when the phone company's general rate increase is supposed to become effective," he added.

Other groups reportedly considering court action include National Data Corp. and the Committee of Corporate Telephone Users, which represents 53 automobile rental, banking, direct mail and retail merchandising companies.

Teletype Units To Wed Designs Of AT&T, IBM

SKOKIE, Ill. — Through its Teletype Corp. subsidiary, AT&T next year will offer terminal cluster controllers compatible with IBM's 3274 and 3276 families and supported by IBM's Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) protocol.

The marriage of AT&T and IBM designs will come in a new version of Teletype's 4540 cluster controller, which also will feature 24 programmable function keys.

This announcement by Teletye suggests less than universal commitment within AT&T organizations to the Advanced Communications Service (ACS) Bell has proposed, but not fully developed, as an alternative to IBM's SNA.

Insert Mode

Besides fitting SNA, the 4540 will come with an IBM-compatible insert mode and "erase-to-end-of-field" function, Teletype announced. Existing 4540s can be upgraded to have these IBM features.

A 4540 will cost $26,700 for a typical cluster arrangement that includes six terminals and a single 340 char./sec printer, Teletype noted.

Deliveries will begin in second quarter 1982, the AT&T company said from 5555 Touhy Ave., Skokie, Ill. 60077.

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But Prefer to Lease, Not Buy

Users of IBM 4300s Say They're Happy

By Tom Henkel
CW Staff

NEW YORK — IBM 4300 users are happy. They like their systems; they like IBM. And a majority would recommend both to other users. Ironically, while users gave the 4300 series glowing reviews, few care to own one.

That was the finding of a recent poll of 45 IBM 4300 series users conducted by Martin Simpson & Co. here. The survey concluded: "Users expressed a high level of satisfaction with both the 4331 and the 4341, although the 4341 generally received higher performance ratings than the 4331."

Sixty-eight percent of users polled lease or rent their systems, and 81% of that group said they had no immediate plans to purchase their systems. Thirteen percent said they were giving the idea some thought and 6% said they were undecided on the purchase question, according to the survey.

In addition, the DOS/VSE operating system, which is used by twice as many 4331 users as 4341 users, received good or better marks. Some users, however, complained of bugs in the first release of the operating system.

Price/Performance

The 4300's price/performance ratio was the overwhelming deciding factor among users questioned. Seventy percent of the 4331 users polled and 80% of 4341 users said price/performance was the key issue. Users of the 4341 rated speed and capacity as second and third in importance, while 4331 users ranked program compatibility and IBM service as runner-up considerations.

Eighty-seven percent said their reasons for choosing a 4300 are still valid today. However, the 7% questioning their original decision were all 4331 users. Complaints about that system ranged from it being too small to it not being interactive enough to be used in a communications network, the survey noted.

Users sampled by Martin Simpson seemed curiously devoted to IBM. Asked what they would have done if the 4300 series had not come along, 75% said they probably would have gone with another IBM processor. A majority of users said high-end 370 models were the next logical choice, while some 4331 users mentioned System/38 and Series/1 as possible.

While the users seemed dedicated to IBM, other vendors' systems were also mentioned as alternatives. Digital Equipment Corp.'s VAX-11/780 and the smaller PDP-11 were mentioned along with Data General Corp.'s Eclipse series, Honeywell, Inc.'s DPS Level 66 and assorted Burroughs Corp. and Sperry Univac processors, according to the survey.

Users of the 4341 are more committed to IBM software than the smaller 4331 users. Asked what other systems they considered, the 4341 users almost exclusively mentioned plug-compatible manufacturers (PCM), while the 4331 users mentioned non-software compatible vendors.

While some IBM users have been pleased with PCM processors, the users in the Martin Simpson report said they rejected Magnuson Computer Systems, Inc. processors because they did not have the same speed, Cobol orientation or features offered on the 4341; Control Data Corp.'s IBM-compatible Omega line because it was not as cost-effective as the 4341, the survey said.

Others Rejected

Users of the 4331 rejected vendors like Burroughs, Honeywell, CDC, Univac, DEC, Prime, Hewlett-Packard Co. and NCR for basically the same set of reasons: a lack of IBM compatibility and a failure to meet IBM's price/performance ratio, according to the survey.

However, a surprising number of 4300 series users did not bother to contact other vendors. Forty percent of 4331 users contacted and 60% of the 4341 users said they did not look at any other system.

Asked what changes they would like to see in 4300 hardware, users said better tape drive support, diskette support and more fast multiplexing channels.

When it comes to operating systems, 83% of 4331 users said they used the native DOS/VSE operating system. Forty percent of 4341 users also use DOS/VSE. A small percentage of 4331 users said they use other IBM operating systems including VM/370, DOS/VS and VM/CMS.

Equally as many 4341 users use OS/VS1 as do DOS/VSE. Other popular 4341 operating systems were VM/370, DOS/MVT, DOS/VS and VM/CMS. Suprisingly few users, 7%, said they were using the MVS-SP operating system; however, the survey was conducted before many users had the 4341-2 processor installed. Industry analysts have said that processor is better equipped to handle MVS-SP — IBM's largest.

The survey, conducted during the last two quarters of 1979 and all of 1980, costs $225, from 115 Broadway, New York, N.Y. 10006.

Entrepreneur Finds Successful Formula

(Continued from Page 1)

business and technical skills obtained through her formal education and her work with GE were naturally helpful when Kurtzig decided to start her own business. However, the decision that it was time to start a family was the actual catalyst for Kurtzig's launching as a free-lance contract programmer in 1972 — a decision that resulted in the formal incorporation and launching of ASK on the West Coast just two years later.

Developing manufacturing software for several local companies led to requests from other firms that she "do the same thing for us," she recalled. Because each of these contracts called for additional refinements, Kurtzig eventually wound up developing a manufacturing system software package, which she licensed to Tymshare, Inc. in 1974.

During the same year, Hewlett-Packard Co. contacted her for help with a Los Angeles customer who "liked the [HP] hardware and wanted some software to go with it."

That was Kurtzig's introduction to the world of minicomputers. "HP picked us. At the time, I didn't even know how to spell minicomputer," she said.

Calculated Risk

With the capacity for calculated risk-taking that typifies many successful entrepreneurs, Kurtzig recognized enough potential in the mini-systems market to invest $20,000 of capital in the newly incorporated firm. That entire amount came from retained earnings, Kurtzig pointed out. Thus, she made the move from developing software packages for mainframe environments to supplying turnkey minicomputer-based manufacturing and financial management systems.

Although most of ASK's business is in the turnkey area, the firm's Manman family of software products is also marketed by Sperry Univac under a licensing agreement.

Estimating about one-and-one-half years to complete the switch to minis, Kurtzig found the real turning point came when ASK installed an HP 1000 system at Hughes Aircraft in 1975.

With a reported average annual revenue growth rate over the last three years of 225% and projected sales of approximately $20 million for calendar year 1981, both ASK and its president are long past the days when long-term company plans revolved around surviving as a profitable entity. "It takes more formal planning and thought now" to get into the mini market, she said.

One way Kurtzig has responded to the needs imposed by more formal and long-term planning is by attending Harvard University's seminars in advanced management techniques.

Designed for chief executive officers of firms with sales between $4 million and $50 million, the month-long courses are spread over a three-year period. Attendance is well worth even an overworked entrepreneur's time because the seminars focus on developing the financial, marketing and sales skills that are required for success if you are heading up an organization, she said.

The Harvard courses also helped Kurtzig develop "good peer group relationships" and enabled her to avoid the sense of aloneness that is often associated with being a top-level executive. She stressed that she is more apt to become involved with business-oriented networks rather than those oriented exclusively toward women.

Real Advantage

"I think it's a real advantage being a woman [in business]," she said, perhaps because "men are often willing to help you out since they don't view you as competition." ASK is "judged more as a company run by a management team rather than as a company run by a woman," according to Kurtzig.

Her advice to would-be entrepreneurs in high-technology areas, be they male or female, is to go after the best possible educational background. She recommends obtaining a degree from a "well-respected school." This puts you on a par with your peers, she said.

Noting that the degree probably would have no effect on evaluations of on-the-job performance, she still felt that employers use a college degree as a means of sifting through job candidates. The other requirements are a capacity for lots of hard work and the refusal to give up, she said.

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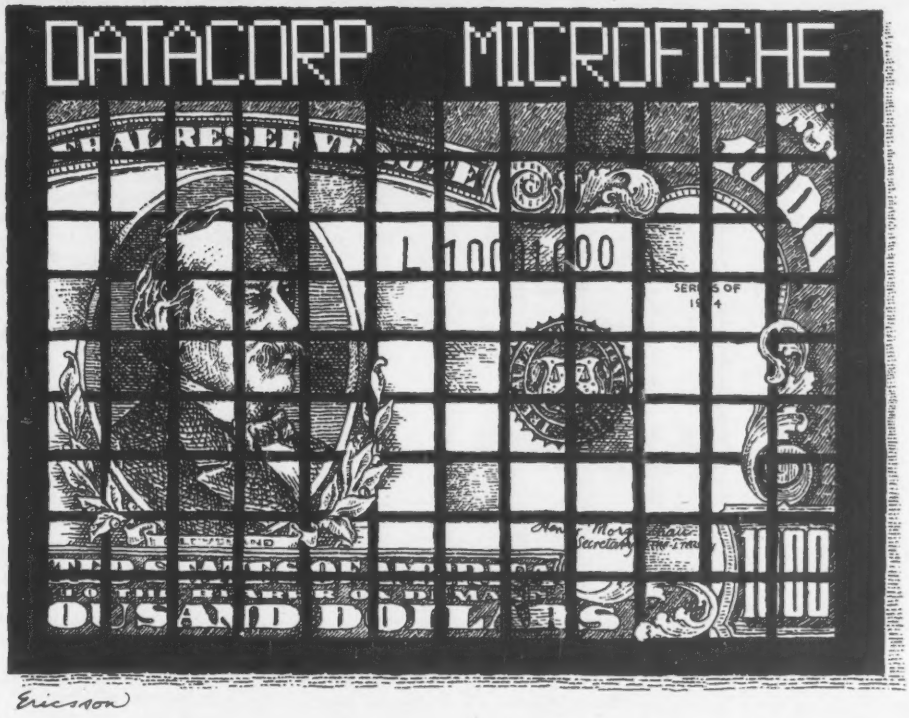

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Xerox Abandons Xten Plans, Blames Economic Forecast

(Continued from Page 1)

communications Network (Xten) project.

The now-defunct Xten was one of the three best-known vendor solutions to a problem most large DP users face: How to move a lot of data — occasionally mixed with voice and text flows — across the nation rapidly and then distribute it efficiently to a local network of terminals and other peripherals.

Data communications users may now find the services of IBM-affiliated Satellite Business Systems (SBS) and the much-delayed Advanced Communictions Service (ACS) of AT&T more attractive, according to Norman Brust, vice-president at Network Analysis Corp. (NAC)

Xerox had filed a Federal Communications Commisssion (FCC) proposal for Xten in November 1978 and relied heavily on NAC for technical advice on the project from roughly then until Xten operations were moved from Woodland Hills, Calif. to New York early last year [CW, March 10, 1980].

Bad Economics

Xerox on May 14 declared that studies of Xten showed "the concept is technically feasible, but the economics, for Xerox, are not. Other demands on the company's resources, combined with the substantial level of investment required to implement Xten in today's uncertain economic environment of high interest rates and inflation, have diminished the attractvieness of the Xten investment."

Both Xten and SBS involve satellite links. With Xten, data would be broadcast at microwave frequencies to an orbiting satellite, then relayed to the earth station serving the receiving site's region. From that earth station, the data would be broadcast at radio frequencies in the 10 GHz band to a "local/city node" receiver and relayed from there to a radio antenna on the receiving user's roof.

In contrast, SBS entails broadcasting data at microwave frequencies to an orbiting satellite and relaying it directly to an earth station atop the receiving user's roof. SBS was founded in 1975 as a joint venture of IBM, Comsat General Corp. and Aetna Casualty & Surety Co. The Vienna, Va., company's first satellite was launched last fall [CW, Nov. 24] and started serving a customer a few months later [CW, March 16].

Xerox never came close to delivering Xten, although its FCC application said service might begin late in 1981. Experts on the project said its termination was long expected. The Yankee Group market research company's George Colony told *Computerworld* that Xten appeared doomed shortly after Xerox acquired the carrier WUI, Inc. late in 1979.

The acquisition resulted in WUI President Edward A. Gallagher taking over management of Xten and moving the project from California. According to Brust, Xerox then dropped consulting arrangements with NAC and virtually all other outside advisors. Colony asserted that Gallagher's crew found the Xten staff to be "dreamers" with unrealistic expectations for the proposed digital communications service.

Rumors that Xten was foundering then began circulating among Xerox insiders.

Brust said signs of trouble with Xten were evident when Xerox failed to deliver, promote or even present many details about the service in the months after AT&T admitted to an indefinite delay in delivery of ACS, whose nature remains a mystery to industry experts. AT&T told the FCC in February 1979 "the software development program for ACS will require a significant further effort previously unforeseen."

The confession moved experts to speculate that Bell operating companies might develop small ACS-like networks within their territories; AT&T might base ACS on the data network it used internally; or AT&T might seek development aid from outside [CW, April 30, 1979].

By default, the ACS quagmire helped make SBS the chief rival to Xten, Brust noted. Initially, SBS seemed suitable only for the largest American corporations because the required rooftop earth stations were projected to cost customers as much as $400,000 each.

Xten Effect On ACS, SBS?

By Brad Schultz
CW Staff

ANN ARBOR, Mich. — The death of Xerox Corp.'s Xerox Telecommunications Network (Xten) may slow development of AT&T's Advanced Communications Service (ACS) and the services of Satellite Business Systems (SBS), according to Dixon R. Doll, president of The DMW Group here.

While Xten lived, AT&T and SBS had reason to rush progress with their competitive offerings for long-haul point-to-point data communications, Doll told *Computerworld* last week. Xerox told the Federal Communications Commission (FCC) that Xten could be ready by late in 1981.

The all-digital services SBS began delivering in March would have complemented, not competed with, Xten through the mid-1980s if Xten had held to the schedule Xerox described to the FCC, Doll said. After then, however, Xerox faced tough competition with SBS.

In February 1979, AT&T publicly admitted to serious snags in ACS development, but the common carrier's offering also loomed as possibly an attractive alternative to Xten, Doll noted.

Xten's termination narrows the field of major vendor solutions to DP users' long-haul problems to SBS, ACS and the electronic mail offerings announced by GTE Telenet Communications Corp. and Tymnet, Inc. in the past year, the consultant said.

Appeals Court Battle Predicted

Judge OK's $2.3 Million Award to NCR User

By Bill Laberis
CW Staff

SAN FRANCISCO — A federal judge has refused to reduce the $2.3 million fraud verdict returned by a jury in March against NCR Corp., setting the stage for a protracted battle in the U.S. Court of Appeals here.

But despite the prospect of two or three more years of litigation, the attorney for The Glovatorium, a wholesale suede and leather cleaner that first brought the suit, said the latest court decision makes him more confident than ever the huge judgment will stand up to NCR's appeal.

The Glovatorium was awarded $2.3 million following the jury's finding that the Dayton, Ohio, vendor had willfully sold the user a minicomputer package it knew would not work.

In addition, the verdict was allowed to stand unchanged in the face of NCR's claim that it was protected from some of the award by a non-consequential damages clause it routinely inserts in user contracts.

The clause states the vendor will not be held liable for any loss of business or profits or other (consequential) damages the user might suffer from any proven breach of contract.

Significant Precedent

Judge William Schwarzer's decision to overrule the clause, commonly used by other vendors as well as by NCR, could become a significant factor in the growing number of fraud and breach of contract user suits pending against several computer manufacturers.

In essence, the verdict could be cited as a precedent in other cases where vendors seek immunity from some damages on the basis of a non-consequential damages clause.

In the case of The Glovatorium, a jury awarded the plaintiff more than $230,000 in consequential damages and more than $2 million in punitive damages.

"We feel better now than ever about our situation," said Richard Perez, attorney for The Glovatorium. "Not only did the jury rule in our favor, but the judge who presided over that trial has also. We felt he came on very strong against the company (NCR)."

Acknowledging NCR's appeal of the verdict, Perez said he and his client are prepared to wage an appeals battle that could "last up to three years.

"The most important issue is that the judge let stand the award made for consequential damages, even though NCR sought protection with the non-consequential damages clause in the contract with The Glovatorium," he said.

The importance of the decision was also hinted at by other lawyers who have sued manufacturers on fraud and breach of contract charges.

Attorney Barrett F. Kalb represents Chatlos Systems, Inc., which brought suit against NCR in the summer of 1979, charging breach of warranty and fraud in the delivery of a minicomputer system.

Chatlos was awarded $125,000 in actual and punitive damages when NCR was found to have violated its contract. Both sides appealed the verdict, with Chatlos seeking more money and NCR seeking to wipe out the judgment altogether. The case was believed to be the first verdict returned against a computer manufacturer to include an award for loss of profits [CW Jan. 21, 1980].

Damages Doubled

This March, however, U.S. District Judge Lawrence A. Whipple removed the consequential damages that had been awarded Chatlos, while he more than doubled the original damage verdict to $300,000. The judge ruled that Chatlos was entitled to receive damages for the value of a system that would have worked at the time the company accepted delivery of the allegedly faulty system from NCR, Kalb said.

"We were not able to prove fraud, so it is a little difficult to compare our case to their's [The Glovatorium's]," he said. "But the question was raised whether the failure of the warranty eliminates the provision that one cannot get consequential damages.

"There had been no precedent-setting decision in the New Jersey district on the issue, and the individual jurisdictions were evenly split in the matter," he continued. "The court decided that if the state Supreme Court were to hear the issue, it would probably uphold the limitation on consequential damages in lieu of a precedent."

Kalb added that a judicial ruling on the consequential damages issue could well vary from district to district in the U.S. courts, depending largely on precedent-setting cases handed down in the past.

Thomas Cristo, who represented Wheeling Heating Co. in another case against NCR, said the award of consequential damages in cases involving computer vendors and users is "a fact of life." Just two weeks ago, Wheeling and NCR settled their differences out of court for terms Cristo said he could not disclose.

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Users Look to Robotics to Meet Diverse Needs

By Bruce Hoard
CW Staff

BRIGHTON, England — The needs of users attending Automan '81 here last week were as diverse as the array of robots and automated assembly equipment on display at the show, which was attended by more than over 700 people from 21 countries.

Max Lembke, engineering manager for Wilkinson Sword, Ltd., was primarily interested in linear-type robots that could help produce disposable shaving systems.

"Assembly is the main trend in our business," he said. "We don't believe in doing something ourselves if we can buy it."

CW at Automan '81

Unlike most attendees, Lembke was disappointed in the scope of the exhibition, which was attended by many of the biggest names in U.S. and European robotics, such as Unimation, Inc. and Cincinnati Milacron, Inc.

Patricia Merry is divisional manager for Scicon, a British computer systems house. She was at the show to increase her general knowledge of robots, "so if we talk to manufacturers, we know what we're talking about," she said.

Asked what she thought the next trends in robotics would be, she replied, "At the moment, most manufacturers in the UK aren't even coming to grips with what you see here. It's still very much in the future."

Welding Robots

Welding is currently the most widely used robot application, and that is the aspect of the exhibition that interested John Love, who is working on the development of automatic welding processes for shipbuilding at Newcastle University.

"The development of robotics is very important," he said. "We can't stay behind the rest of the world. They are using more robots than we are. Even if we can't produce robots, we should at least be good at using them."

Injection molding is another growing area of robot application and was the object of Alan Wiseman's attention. Wiseman, of Stadium Ltd., said, "There is a bigger choice this year than there was last year," when asked about the offerings.

Roy Howe, senior manufacturer engineer for Teleflex Morse, Ltd., was looking for robots for manufacturing and assembly. His company has yet to purchase any of the machines, but said that-based on what he had seen at the show, "This could make it easier to cost-justify buying them."

Stuart Beales, production engineer for Europower Hydraulics, Ltd., had a general interest in automated metal-working equipment for bolt products, as well as a more general interest. His company may purchase some pick-and-place robots for its needs, he said. Beales called the show "excellent."

Union Opposition

Alfred Cox is building a new engineering works to manufacture agriculture machinery. The technical director of Tanco Engineering Co., Ltd. was looking for welding and painting robots to help him. But he's facing opposition to the old plant's union. The "workers will accept robots for dirty work, but they're pretty reluctant to accept them in clean jobs," he noted.

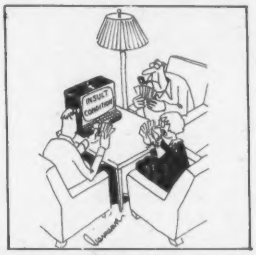
As usual, the vendors were optimistic. In their opinions, users know what they want and are ready to spend.

"A lot of people are looking for something easier to program," said Alan Twyford, southern England sales manager for Nordson (UK) Ltd. "And they're looking to get away from tape control. They want the second generation of robots."

The Nordson system, including the robot, control panel and hydraulic power pack, sells for approximately $100,000."

Users are looking for justification for the purchase of robots, according to Edward Johnston, controls and electronics consultant for Haden Drysys, Ltd.

"So far, most of the people have asked the price of our system and none of them have appeared to be put off by it," he observed. That price is just more than $100,000 and includes the robot arm, hydraulic power pack, computer, operations console and teaching modules.



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British Government Pays Up to 25% of Costs For Robotics Development

By Bruce Hoard
CW Staff

BRIGHTON, England — The British government will pay up to 25% of robotics development costs under its Product and Process Development scheme, C.W. Adams of the UK's Department of Industry said here last week.

Speaking at Automan '81, a combination of the annual conferences of the British Robot Association (BRA) and Assembly Automation, Adams said the 25% subsidy is one of many ways the British government is supporting the growth of robotics.

The 25% development subsidy can include the cost of prototype, preproduction machines, modifications and other developments up to the point of commercial production. The government even helps to place the robot.

"Where a user shows interest, but is reluctant to be the first to try out a robot, we are prepared to place a contract with the robot manufacturer and place the machine with the user company for evaluation in a working environment," he said.

Free Trial Period

The user pays nothing, but at the end of the loan period, the company is expected to buy the robot at a depreciated price if it has operated satisfactorily. Hall Automation and the European subsidiary of Unimation, Inc. are examples of companies that have received government assistance.

Addressing the government's role in research, Adams echoed sentiment offered by British Prime Minister Margaret Thatcher during her opening remarks at the conference: "We must make sure that even if Britain is not at the forefront in the first generation of robotics, we are well up when it comes to the second."

Both the National Engineering Laboratory and the Science Research Council are working toward that goal. The former is doing it under

CW at Automan '81

the automated small batch production project and the latter through a program to encourage academic and industrial collaboration in robotics development.

Robotics application was an area of great interest at the conference, and Adams stressed the government's interest by saying that user firms must awaken to the opportunities robots can offer them. He cited his recent visit to a factory where he saw a robot create a weld in 11 seconds that would have taken a human nine minutes.

'Sterling' Work

Adams lauded the British government for its awareness of robotics even though there are only 370 of them in the country. The Production Engineering Research Association (Pera) does "sterling" work in disseminating information about robots and has established 18 specialist discussion groups seminars, he said.

The Department of Industry has also provided Pera with assistance in efforts to develop a robot advisory service. That service will offer a free initial assessment of the suitability of potential applications, he noted.

"Where there appears to be a case for robot application, Pera can undertake a full 15-day appraisal on a 50% shared basis," Adams said, adding, "we are considering extending this arrangement to certain other selected consultants."

Careless CPU Reprogramming Found Cause of 1979 Jet Crash

LONDON — The careless reprogramming of the flight computer was the cause of the Air New Zealand jet crash into Mount Erebus, Antarctica, in November 1979, in which 257 people died, according to a New Zealand judge.

The aircraft was on a sight-seeing tourist flight to Antarctica — billed as "A Journey to the End of the World" — when it hit the 12,200-foot mountain.

As reported recently in *The Economist*, published here, the inquiry by Justice Mahon reverses the previous conclusion that the pilot was flying too low "when the crew was not certain of their position" — a view strongly endorsed by the airline.

Flight Route Altered

In clearing the crew and blaming the airline, Mahon reported that the computerized flight route, which was fed into the aircraft's automatic pilot, had been altered shortly before takeoff because of an error in the original data.

The pilot, however, was not told of the change, which sent the aircraft on a direct path over the volcano. When the pilot obtained clearance from the American research base at McMurdo to descend below the clouds so the passengers could get a better view, he had no idea he was flying straight at the mountain, the magazine reported.

The Mahon report denounced the airline's "incompetent procedures" and the "haphazard, informal" planning of Antarctic flights in general. Its most scathing criticism, however, was aimed at the airline's senior executives, including Chief Executive Morrie Davis, who tried to blame the crew for the tragedy through an "orchestrated litany of lies," according to the report.

Mahon also criticized Davis for his "extraordinary" action in destroying many relevant documents.

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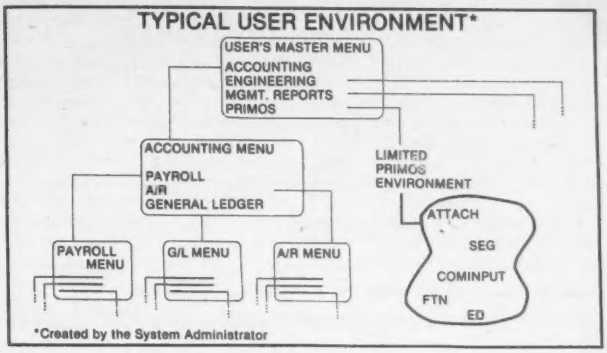

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Newspaper Guild Wants Long-Term CRT Probe

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Despite several government reports indicating the safety of CRT terminals, the Newspaper Guild — a major catalyst for the federal studies — is lobbying for a long-term government-funded investigation to determine whether CRT terminal operators are developing cataracts or other health damage resulting from CRT terminal radiation.

Noting there have been several unexplained incidents of CRT terminal users suffering cataracts or bearing malformed children, Guild President Charles A. Perlik Jr. recently urged a congressional subcommittee to back further testing.

Effects Discovered

"Biological effects have been discovered in recent years at both frequencies and power densities lower than previously believed likely," Perlik told a House science subcommittee recently.

Estimating there are about 23,000 CRT terminals in U.S. newspaper offices, he termed guild members "the guinea pigs" of CRT terminal safety research.

"Laboratory research would seem to be in order to determine whether there are indeed biological effects from radiation in the CRT terminal frequency range, and if so whether, as one would suspect, those effects are harmful," he said.

The guild president conceded independent tests performed for his organization and studies by the National Institute for Occupational Health and Safety (Niosh) have found CRT terminal radiation to be minimal, but claimed the numbers of CRT terminal operators developing cataracts constitute "an unusually high ratio of unexplained cases."

"We are fully aware that the great run of CRT terminal radiation tests, by Niosh and other agencies, including the BRH (Bureau of Radiological Health), has shown extremely low emissions," Perlik said.

Few Models Tested

"But only 28 of the 60 U.S. companies the BRH records as manufacturing or importing CRT terminals and only five of the many foreign companies were represented in the BRH tests, and only a relatively small number of their models were tested," according to Perlik.

Therefore, he said, "we feel that, despite the weight of the test results to date, periodic testing of CRT terminals operating in our shops is still necessary."

Perlik added most publishers have not been receptive to such monitoring. He particularly noted the difficulties Niosh reportedly has had gaining publisher cooperation in testing CRT terminal safety at the Baltimore *Sun* newspapers.

In general, he continued, "we think a shift in focus on the problem is in order. We think it is essential to find out what scientific method can tell us about the *effects* of possible radiation from CRT terminals on the health of the people who operate them.

"Attention has been concentrated for too long exclusively on the presence or absence of radiation in relation, particularly in the case of radio frequency radiation, to standards that are subject to revision and dispute and to health effects whose nature and range are far from being fully explored."

Widespread Complaints

Perlik said "while the existence of a radiation hazard from CRT terminals may be debatable, there is no debate about the fact that CRT terminals have produced widespread complaints of visual impairment and pain, musculoskeletal problems and related afflictions."

Whether they produce permanent impairment, he said, "remains a question still to be answered."

With that in mind, the guild has arranged for the Mount Sinai School of Medicine to conduct a "wide-ranging study" into CRT terminal health effects, Perlik said.

"What is needed," he concluded, "is a full-fledged, government-funded study, unhampered by financial limitations, of a large population of CRT terminal users and appropriate controls over a period of time to determine whether CRT terminal operators are developing cataracts or other health damage attributable to radiation — or any other cause — in numbers significantly higher than other office employees."

Bell Exec Touts EIS to Publishers

CHICAGO — AT&T Vice-Chairman James E. Olson tried to allay fears of the nation's newspaper publishers when he spoke here recently at the annual meeting of the American Newspaper Publishers Association. The publishers are worried that Bell's plans for offering a videotex-based Electronic Information Service will shift advertising dollars from hard-copy newspapers to soft-copy TV screens.

Olson insisted that the fears are groundless. AT&T, he said, wants only to supply telephone directory information and Yellow Pages advertising. All other types of information would be obtained from outside providers. "I doubt very much that a service [that] will only reach about 7% of all households by 1990 is more of a threat than radio and television were," Olson said.

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Testimony Backs Recent Findings

House Told CRT Users Face No Health Risks

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — CRT terminal operators face no health risk from radiation emissons, according to testimony presented recently at hearings by a House of Representatives science subcommittee. The testimony supported recent findings by other government agencies.

Summarizing the testimony, Subcommittee Chairman Rep. Albert Gore Jr. (D-Tenn.) said "the prevailing scientific opinion seemed to be that adequate precautions had been taken by manufacturers to ensure that the levels of nonionizing radiation emitted by these instruments were very low."

Gore reached that conclusion after two days of what he termed "controversial testimony" from representatives of CRT terminal manufacturers, federal health agencies and newspaper publishing and labor union groups.

Several of the witnesses referred to recent reports by the National Institute for Occupational Health and Safety (Niosh) and the Food and Drug Administration (FDA), which supported industry claims by concluding CRT radiation is well within safety levels [CW, April 13, May 4].

John Rankine, IBM director of standards and data security, for example, quoted from the Niosh report that said: "It is readily apparent that the radiation levels are far below current standards and, in most cases, were not detectable.

"Based on the radiation survey data from this investigation and previous Niosh investigations, it can be concluded that the CRT does not present a radiation hazard to the employees working at or near a terminal."

Questions Remain

Despite those findings, Gore, a former newspaper reporter, ventured that the "questions of possible effects — including cataracts — at very low levels of radiation, as well as the stress effects of these instruments, continue to be very much on the minds of newspaper reporters, editors and other operators around the U.S."

Indeed, a representative of the Newspaper Guild indicated to Gore's Science and Technology Subcommittee on Investigations and Oversight that resolution of these questions will continue to be high on the agenda of labor negotiations with newspaper management.

While the subcommittee plans no further hearings on the subject, the panel would like to see long-term epidemiological studies or experiments with laboratory animals to confirm the FDA and Niosh findings.

No one has been able to adequately explain reports of cataracts and birth defects suffered by CRT terminal operators, remarked Subcommitee Counsel Tom Grumbly in an interview following last Tuesday's hearing.

Industry "has been all too quick to accept the safety" of these devices, according to Grumbly, who said it is only logical to assume that because exposure to high doses of various types of radiation can cause cataracts, there may be a health hazard in long-term exposure to low levels.

The subcommittee feels long-term testing could "put to rest" fears about CRT use, Grumbly said, but noted this kind of testing "does not seem to be the way the [scientific] community wants to go."

Addressing that point, Gore said "we must not let ourselves forget the pain and anguish this society has gone through on technologies that were not adequately tested before they were widely used."

He said that the lessons of experience from pesticides and chemicals were clear.

Corrections

To borrow from an old phrase, reports that more and more users are leaving IBM's mainframe fold weregreatly exaggerated.

Because of a typesetting error in Datapro Research Corp.'s annual "User Ratings of Computer Systems," *Computerworld* reported [CW, May 4] that more than 23% of the 1,075 IBM users that took part in the survey were planning to acquire non-IBM mainframes in 1981, a figure nearly six times that reported in last year's survey.

Actually, however, while 27% of the present IBM users plan to change equipment this year — an increase of 2% over last year's figures — only 4% of these users plan to step out from under the IBM umbrella.

At some point during the process of collating, writing, proofreading and typesetting the report — which included responses from 4,218 computer users — Datapro mixed the survey items on page 70C-010-50vv under the category "Plans for System Replacement in 1981."

As a result, the more than 23% of the users listed as changing to a different vendor this year should have been listed as changing equipment, but sticking with IBM.

The nearly 3% listed as changing equipment and staying with IBM should be recorded as changing and moving to another but as yet unknown vendor — which cou'd possibly be IBM.

Fewer than 1% of the users polled are definitely changing equipment and moving away from IBM.

In the same story, the number of IBM 3032 users in the survey was incorrectly reported as 112. The correct number of 3032 users that took part in the survey is 30.

In "Business Users Seen Adapting to Packages" [CW, May 18], Dr. Richard Wexelblat's first name was incorrectly given as Paul in an article on Univac's developments in application software. Dr. Wexelblat has a brother, Paul, who is employed by Digital Equipment Corp.

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ACU: Regulatory Hijinks Hurt Users by Discouraging Competition in DP Services

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — End users are largely being ignored in the debate over whether regulated entities, such as banks and AT&T, should be allowed to offer data processing services, a spokesman for the Association of Computer Users (ACU) warned recently.

Users could be hurt in the long run because the established DP services industry is resorting to "regulatory shenanigans" to "lock out the competition," Hillel Segal, association president, told a House antitrust subcommittee recently.

"The entry of new firms into the marketplace is not an event for public uproar or legislative action; it is a normal process which is to be welcomed within our free society.

"It is our view," Segal said, "that the end user can best be served by allowing wide-open competition, provided of course that fair and ethical business practices are always used."

It is the question of what is fair competition that has aroused industry groups such as the Association of Data Processing Service Organizations, Inc. (Adapso). These groups have fought the DP service offerings of large banks — most notably Citibank of New York — in Congress, the courts and before federal regulatory agencies .

Addressing that point, Adapso representative David Chaffin told the subcommittee "banks are too influential with the Comptroller and the Federal Reserve Board, who determine in what ways banks may compete with us.

"We believe there is a solid case in logic and equity for denying banks, indeed all regulated companies, the right to compete in nonregulated industries," according to Chaffin, president of Applied Data Processing, Inc.

Segal argued, however, that "the interests of millions of consumers take precedence over the self-serving strategy of an industry in-group.

"If the entry into the ranks of vendors of a new firm or group of firms comes at the expense of some established suppliers, this is an act of life which is certainly important to them, but is of less concern to the customer," Segal said.

"The customer's interest is best served through the interplay of unrestricted business," according to Segal, who said, "it is evident from the position of some suppliers that they feel the door should be shut once they are inside."

In an interview following his testimony, Segal qualified his statement by saying "we don't mean just because we're taking this pro-competitive viewpoint that banks and AT&T . . . should have no restrictions at all upon comingling their regulated and unregulated activities."

Separate Subsidiaries

He called for truly separate DP subsidiaries to be set up by regulated companies, suggesting this "compromise" will be acceptable to all parties in the debate.

"What we mean is separate subsidiaries that are funded separately and have separate accounting and sales staff and in essence act independently. It's the ownership that should not make any difference," he said.

In a recent interview, Adapso President Jerome L. Dreyer said that sort of compromise is essentially the association's "fallback position."

"The ultimate that one would like to see would be to have regulated, licensed industries . . . not participate in the marketplace because of the unfair competition it creates and perhaps illegal competition."

But, Dreyer continued, "the best we can hope to obtain in [the] real world is true maximum separation where seed money is given the subsidiary, but from then it's a separate entity and must stand or fall in the marketplace.

"So our main position is that, until the laws are changed and there is a clear-cut direction in the law, regulated industries should not be permitted to engage in the private sector," the Adpaso executive said.

Whether these industries should be deregulated or not is up to Congress, Dreyer said. He also noted that there is litigation pending against AT&T and Citibank that will probably affect the way their industries are deregulated.

"Should the laws be cleared up, then we would opt for safeguards, and the only safeguard that we're aware of that has potentially some decent affect — it's not the ultimate — is maximum separation," Dreyer said.

Cbema Petitions FCC on AT&T

WASHINGTON, D.C. — If the Federal Communications Commission (FCC) lets AT&T offer a recently proposed video teleconferencing service, the commission should insist that it be done through a separate subsidiary, according to the Computer and Business Equipment Manufacturers Association (Cbema).

Alternatively, if AT&T operating companies are allowed to market the service, charges for studio facilities should be totally unbundled from those for transmission to prevent surreptitious cross-subsidies, the association added in a petition submitted to the FCC earlier this month.

Cbema also filed a second petition requesting the FCC to require unbundling of the transmission and equipment charges included in AT&T's new Comm-Stor service.

Behind both petitions is an attempt by the association to clarify a key provision of the FCC's Second Computer Inquiry Decision, issued last December.

Under that decision, terminal equipment can be marketed by AT&T operating companies until March 1 next year.

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Federal Red Tape Slammed For Hiking Medical Costs

By Rita Shoor
CW Staff

NASHVILLE, Tenn. — If the price of medical care is sending you into shock, don't blame just the health care institutions. Government regulatory reporting requirements share responsibility for the increase in these costs in the past 10 years, according to Dr. Vernon E. Wilson, vice-president of medical affairs at the Vanderbilt University Medical Center here.

While agreeing with Harvard Professor Regina Herzlinger that there is a trend toward deregulation in the Reagan administration [CW, April 27], he said the situation was characterized by "lots of talk and very little action yet."

Wilson pointed to a Reagan proposal to eliminate the Professional Standards Reviewing Organization (PSRO) program as a good move toward deregulation. He characterized the program as "bureaucracy on bureaucracy," adding, "we should get rid of it."

Wilson, however, is no stranger to Washington's political infighting. He was a member of the Department of Health, Education and Welfare under Eliot Richardson from 1970 through 1973. He was reluctant, therefore, to comment on the proposal's real chances of being implemented.

Fact of Life

Government regulation appears to be a fact of life in the health care area, and Vanderbilt has installed at least two automated reporting systems at an estimated cost of $180,000 in an effort to stay ahead of regulatory reporting requirements, Wilson explained

"In the last decade, we've had to account for things that we didn't have to account for before," he said. One example given was the reporting required for large capital expenditures. Although this process is "just now being developed in the volunteer sector," Wilson continued, Vanderbilt foresaw the need for a computerized system that would keep track of the amount of space available in the medical center and how that space is utilized.

This space inventory system represents an overall investment of between $75,000 and $100,000 throughout the last five years.

The medical center also has to keep track of all equipment for which the cost exceeds $500 and feed that data into its bookkeeping system. Rather than developing this system in-house, Vanderbilt asked an unnamed software vendor to adapt its package to the center's specific needs. With an intial cost of some $30,000, it took an additional $50,000 to get the software running in production mode, Wilson estimated.

"We would not have installed the system if we hadn't been trying to stay ahead of regulatory reporting requirements," he stated. However, he felt that both systems had, in fact, "more than paid for themselves" eventually within the university environment.

Vanderbilt has been asked by the federal government to generate reports that account for the working time of every person at the medical center who is paid by federal grant. In some cases, this involves keeping track of individuals who split their time among private practice, the institution and work tied to a federal grant, he explained.

While the request was made in pre-Reagan times, the medical center apparently has not received any directive that would make it inoperative. Unable to estimate the eventual cost of this additional reporting requirement, Wilson noted that it would obviously "pull heavily on [Vanderbilt's] computer system."

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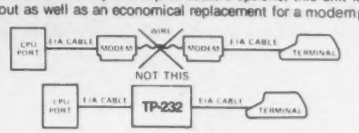

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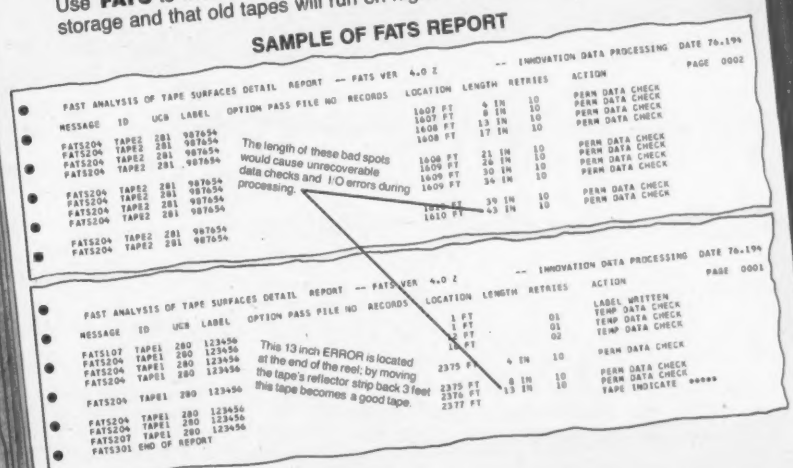
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MESSAGE ID UCB LABEL OPTION PASS FILE NO RECORDS LOCATION LENGTH RETRIES ACTION
1607 FT 4 IN 10 PERM DATA CHECK
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FAT5204 TAPE2 281 987654
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FAT5204 TAPE2 281 987654
The length of these bad spots would cause unrecoverable data checks and I/O errors during processing.
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1609 FT 30 IN 10 PERM DATA CHECK
1609 FT 34 IN 10
FAT5204 TAPE2 281 987654
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1 FT 01 LABEL WRITTEN
1 FT 01 TEMP DATA CHECK
2 FT 01 TEMP DATA CHECK
2 FT 02
16 FT
FAT5107 TAPE1 280 123456
FAT5204 TAPE1 280 123456
FAT5204 TAPE1 280 123456
FAT5204 TAPE1 280 123456
This 13 inch ERROR is located at the end of the reel; by moving the tape's reflector strip back 3 feet this tape becomes a good tape.
2375 FT 4 IN 10 PERM DATA CHECK
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2375 FT 13 IN 10 TAPE INDICATE *****
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Computing in Cuba — Part 2

Cuban DP Industry Progress a High Priority

Wendy Quinones
Special to CW

WALTHAM, Mass.— In the five years since the Cuban government began serious development of the country's computing capacity, more than 200 minicomputer installations have been completed, computer design and manufacture have increased and computer education has become a priority at all levels.

But Cuba's nascent industry remains deficient in hardware and software design expertise, telecommunications is virtually nonexistent, knowledge of Western computer developments is limited and the industry remains dependent on the Soviet bloc's slow development and outmoded, unreliable machinery.

These are among the observations of Peter Graffman, a consultant and assistant professor of computer systems at Bentley College here, who recently spent a week in Cuba on a trip partly sponsored by the college. During that time, Graffman visited computer facilities in and around Havana and spoke with officials in the National Institute of Automated Systems and Computing Techniques (Insac), the government agency that has controlled computer use and development since 1976.

Graffman said that, as a government agency, Insac directs the computer industry according to national priorities and economic realities. In hardware, for example, the recent trend has been away from mainframes toward minicomputers and even microcomputers in tailored, turnkey installations.

"They [the Cubans] talk about the underutilized capacity in the United States. Because of their lack of Western currency and limited trade with the West, they have to improve their own utilization. And because they are centralized, they are in a better position to do it."

Autonomous Centers

Mainframes — at least those outside any military or central government installations, which Graffman did not visit — are largely in the autonomous computing centers located in each province. These are decentralized service bureaus for provincial users, Graffman said. Operating as batch processors and concentrating on simple tasks like data preparation, the mainframes can be productive despite limitations in telecommunications, lack of time-sharing capability and a shortage of reliable peripherals and sophisticated software.

Naturally enough, according to Graffman, the mainframes most common in Cuba are Russian, specifically the Soviet Ryad family of machines developed in the late '60s and '70s to emulate IBM design. The 32-bit ES 1022, a joint Russian-Bulgarian machine first introduced in 1975, may have been the first Soviet use of semiconductor memory; it is equivalent to the IBM 360/40 with a 128K- to 512K-byte memory and a rated speed of 80K instructions per second (Kips). The later ES 1035, still fairly rare in Cuba, improved rated speed to 200 Kips to achieve equivalence with the IBM 370/145.

Like other Soviet bloc countries, Cuba also has access to French and English computers, primarily the French Iris 50 and the English Elliot 803, Graffman said.

But the recent hardware emphasis has been on smaller Cuban-designed computers. By government policy, many of these — particularly the microcomputers — have only one application, such as payroll or bookkeeping.

"They tailor the application as specifically as possible," Graffman explained. "They don't get involved with too much software development and peripheral interfaces that way."

Icid Division

Through the Institute of Digital Research (Icid), a subunit of Insac, Cubans are designing their own CID lines of minicomputers and microcomputers, Graffman said. Whether similar efforts are under way with mainframes was unclear. Even with the smaller machines, he added, "it's difficult to tell how much design is Cuban and how much is pirated. The CID-201 has a similar 12-bit architecture to the PDP-8, and the micro chip is an Intel 8080 chip."

Although 1976 marked the beginning of Cuba's aggressive computerization, Graffman said, computer development has spanned more than a decade.

The 12-bit CID-201A, dating from 1969, had only a 4K-byte core memory, no operating system and paper tape and line printer speeds of only 7 char./sec.

By the early '70s, the CID-201B had a 32K-byte core, several languages including Fortran, Focal, Assembler and the Cuban-developed Leal and peripherals with at least doubled printing speeds. The mid-'70s saw added amenities like CRT terminals, four-unit disk and tape capabilities of 3M bytes each and 800 bit/in. respectively, I/O interfaces and the added languages of Algol, Cobol and Basic.

Since 1976, Cuban computer development has increased substantially. The new CID series of CPUs features 16-bit architecture and a 32K-byte semiconductor memory, multiuser capabilities for the first time (up to 16 users multiplexed), report generator software, library structures and operating systems for paper tape, cassettes and minidisks.

The new CID-300/10 also benefits from improved peripherals, although still far behind their Western counterparts. Bulgaria produces the largest disk, which at 29M bytes has only a fraction of Western storage capabilities. A Polish line printer does better at 1,200 line/min. Printing terminals come from Czechoslovakia, and East Germany produces data entry equipment and accounting machines with magnetic cards.

Development Plans

Cuba's development plans include improved networking and telecommunications for a nationwide computer network. Computers at provincial centers will be upgraded — a new CID 400, Graffman said, will probably have expanded memory and more multiuser capability — and new local and municipal computer centers are planned as well.

But Cuba faces a variety of problems in its development drive, Graffman observed. Current technology is outmoded, and little is available from the West. Graffman said microcomputers are still using Intel 8080 chips, which he speculated were imported from Japan.

Japanese Presence

"Nothing was said, but I observed a lot of technology imported from Japan — Toyotas, elevators, radios and TVs," he explained. "And the Soviets still don't have the production capacity for chips, so I would speculate that they're getting them from Japan. Chips are not being produced in socialist countries that I know of."

In addition, the Cubans "don't have advanced production techniques." Existing production still relies on a great deal of hand assembly.

And finally, software in general is in very short supply. "We have companies all over the place developing software for different machines," Graffman said. "They have to develop it all from scratch."

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Casa/SME Opens Nominations For Lead Award in Managemen

DEARBORN, Mich. — The Computer and Automated Systems Association of the Society of Manufacturing Engineers (Casa/SME) is accepting nominations for its first Lead Award.

The award is presented to a company technical-management team that has made innovative and successful use of computer-integrated manufacturing (CIM).

It will be announced at the Autofact III conference and exposition, Nov. 9-12 in Detroit.

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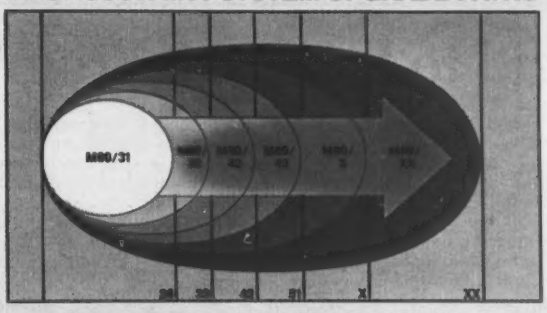

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DBIOC Said to Improve Programs' Efficiency

By Lois Paul
CW Staff

INNISBROOK, Fla. — Using a data base I/O controller (DBIOC) helps programs run more easily and more efficiently, Thomas R. Bradbury of Hay/Huggins Data Services, Inc. explained in a session before Software AG's International User's Group meeting here recently.

In a presentation entitled "How a DBIOC Can Simplify Adamint [Software AG's Adabas macro interface] Calls and Maintain Better Data Base, Administration Control," Bradbury said that 13 of the 21 presentations during the week-long users meeting described DBIOCs.

"This means that a lot of companies don't like the way calls are done or the way Adamint is called, so they'd like to create their own," he said.

A DBIOC is a program placed between application programs and a data base that provides increased control, greater independence and the ability to enhance or extend the environment, he explained.

DBIOC Demands

"The DBIOC really has to be created in individual shops," Bradbury said. "It varies according to the computer and the teleprocessing (TP) monitor. It can't really be written by a company like Software AG."

Normally, in a data base environment a DBIOC cannot become a commercial product. An exception to this rule, he continued, is Adamint, which is designed to increase control of the data base environment.

The main advantage to Adamint, according to Bradbury, is the responsibility it creates within the data base administration group. All calls and user views that are employed by the application programs must be approved and written by a data base person.

This eliminates the need for the programmer to fully comprehend the direct call logic and enables him to concentrate on the programming aspects of Adabas. He said Adamint does not provide the other advantages of a DBIOC, however.

The use of a DBIOC, Bradbury asserted, can carry this a step further and make the data base itself independent.

Major Objective

A major objective of a DBIOC is to create an independence between the application programs and the data. By standardizing the call used by the host language, applications can be used in different environments, eliminating the need for redesigning or coding, Bradbury explained.

These environments can include different TP monitors, interfaces, data bases, sets of files and versions of the same data base. When a change is made to the environment, the DBIOC should handle that change.

This independence must be planned into the application itself, he stressed, noting that one way of accomplishing this is by designing the application with one I/O module.

Citing another problem as the conversion of data from one form to another, Bradbury said this can only be handled by a table, a dictionary, a physical data base change, a recompile of the DBIOC into another library or a Cobol copy code change. Any attempt to put this type of table into the DBIOC would hinder performance.

Once the DBIOC is in place, it can be enhanced to standardize the data base management system calls and the corresponding parameters, Bradbury said. "If your company finds that Adabas is lacking in any data base aspect, the DBIOC is the place to change it."

"The DBIOC simplifies the running of the program," he said, adding that it also can be used to make an application data base independent. The programs would not have to be changed, only the DBIOC.

Bradbury said disadvantages of using DBIOCs include extra overhead, slower performance and costs involved in creating, maintaining and documenting the DBIOC. He stressed the importance of initial planning.

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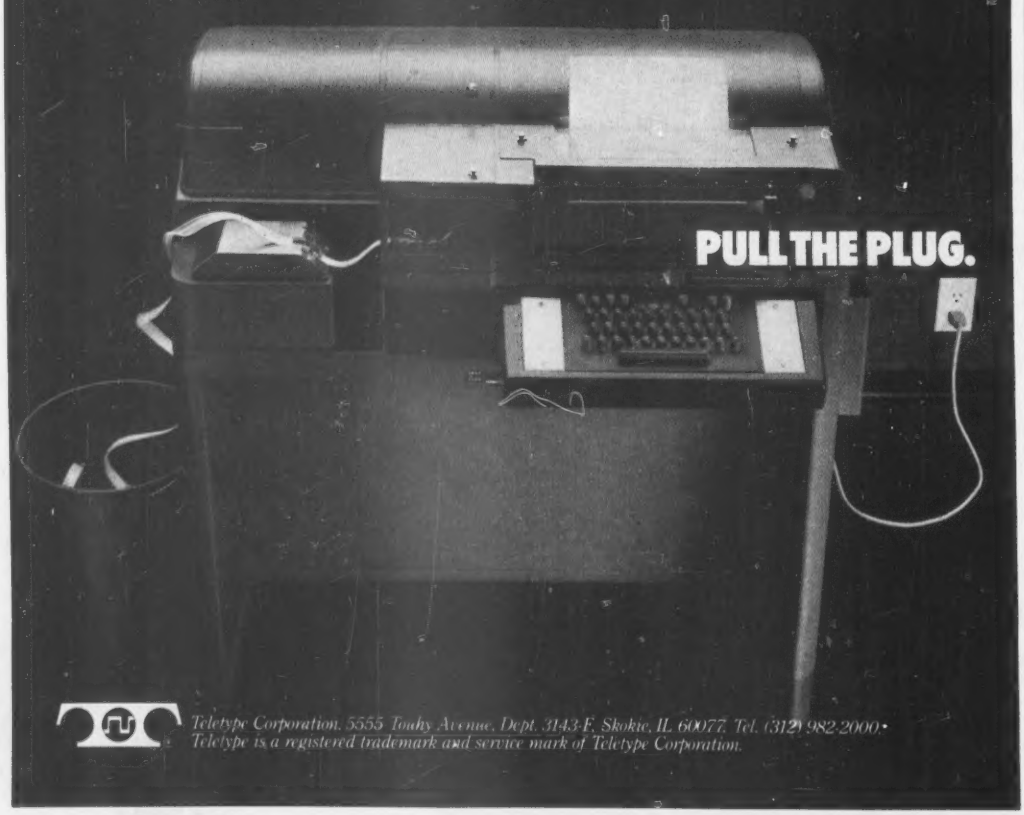

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Prompted by Tremendous Backlog

SPCC Runs First U.S. IBM Information Center

BURLINGAME, Calif. — A tremendous backlog of work, combined with a relatively high level of difficulty finding skilled DP professionals, prompted the Southern Pacific Communications Co. (SPCC) here to become the first U.S. site of the IBM-developed "information center."

"The objective is simply one of teaching end users how to get the information they want without draining time and money from conventional DP operations," Joel Dietrich, head of management information services at SPCC, explained.

SPCC opened its information center in June 1980. Dietrich and his support staff of five have since trained about 200 employees. They expect the number to hit 350 by the end of June. "We announce the classes and they are full in two hours," Dietrich said.

The information center is an organizational concept that IBM developed about six years ago and used internally in its offices in Canada. Last year, IBM selected SPCC as the first candidate in the U.S. for the concept. Dietrich said it took SPCC about 90 days to get it up and running.

"The first thing we did was remove product, vendor, installation and company dependencies," Dietrich said. In addition to changing to a more generalized concept, SPCC added a heavy management perspective. The information center as developed by SPCC is reportedly applicable to any DP environment.

The center enables employees who have never been exposed to the technology to learn how to design and implement solutions to their own DP needs, Dietrich said. "If someone wants to produce a report, we show him how to format it."

The time involved is significantly less than if the person had to wait in line for a programmer to be free to do a task, he explained.

The information center structure includes an introductory section that explains what the center does, what the user has to do and what the center can provide. In addition, there are product-specific courses. "We teach everyone from order-entry clerks to vice-presidents," Dietrich said.

Cookbook Approach

The center uses a sort of simplified cookbook approach to hardware and software tools, he added. SPSS has been so pleased with the results so far that the company is spreading the word in top corporate circles and, with the help of IBM, is offering executives a first-hand look at how the information center concept works.

In December, IBM flew a large group of Pacific Northwest executives to SPCC's headquarters here for an explanation of the program and some hands-on experience.

In late March, 120 senior executives from 23 companies — including Blue Cross, U.S. Steel Corp., Montgomery Ward & Co., Best Western, Allstate Savings and Loan and Litton Data Systems, Inc. — participated in the second semester, which was billed as a two-day national "Fly-In."

The seminar included a discussion of the information center concept, its implementation at SPCC and an evaluation from an end user's viewpoint. The afternoon sessions included case studies and practical exercises using SPCC facilities.

The goal was to inspire the executives to develop information centers within their own companies. "We get nothing out of it," Dietrich said, noting that it is a sense of professional pride in seeing a good idea come to fruition that is the motivation behind the Fly-Ins.

"By and large, there is nothing in it for us except the satisfaction of sharing a successful idea," he said.

He said that eight companies locally are in the process of designing their own information centers. Dietrich expressed concern that if these are set up with the same types of preliminary planning and analysis it takes to establish a DP center, it will take at least a year, and there is a good chance it will not work.

Difficult Justification

He said it is difficult to justify in hard dollars the difference the center represents within an organization. "You may have to wait for the returns to be evident," he cautioned.

One of the biggest returns at SPCC, according to Dietrich, has been that users have gained an appreciation of how difficult it is to get a DP job done.

"The information center at SPCC represents about a $200,000 annual investment. It's worth about $2 million in productivity," Dietrich said.

Of the SPCC employees who have been trained at the company's information center, approximately 40% are from engineering, 40% from finance and 10% are from advertising and marketing.

The employees trained have averaged from one to four hours weekly of actual computer time, accomplishing departmental tasks that involve information retrieval, data analysis, simple computation, comparisons and consolidations.

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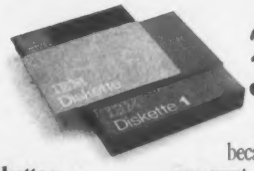

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Aussies Using Dictionary as Corporate Data Base

By Lois Paul
CW Staff

INNISBROOK, Fla. — A data dictionary serves as the "corporate" data base for the Australian Bureau of Statistics (ABS), John Palmer, its director, explained in a session at the Software AG international users group meeting here.

"The boundary of a dictionary is a very blurred sort of thing," Palmer said, adding, "a statistical organization involves one of the widest set of boundaries you might want to set."

The ABS is responsible for official statistics on a wide range of topics for both federal and state government in Australia, Palmer explained. Its data holdings are therefore both voluminous and varied in scope.

"We are therefore interested in the relationships between data and in being as accurate as possible," he added.

A year ago, after a long planning process, ABS acquired a Fujitsu Facom M-200 system running OSIV/F4 operating system at the center of a network of Digital Equipment Corp. PDP-11/70s supporting video display terminals and other peripheral devices.

Also acquired was 8G bytes of disk, which was scheduled to expand to 20G bytes over the next two years, Palmer continued. A bulk storage device was purchased, which can be expanded to 168G bytes over the next two years.

To this, ABS added a Fujitsu Ltd. transaction processor known as AIM DC; Software AG's Adabas data base management system (DBMS); Natural; Adabas Data Dictionary and Job Oriented Language (JOL), a JCL preprocessor developed by Clarke Computer Software, Inc.

Palmer said ABS had begun exploring data bases in 1974 and the following year began using Intel Corp.'s System 2000, the only DBMS then available, on its former Control Data Corp. Cyber 72 equipment. ABS also used a data dictionary system as a System 2000 data base to support data definitions in the bureau's Integrated Economic Censuses System.

"Our business is data," Palmer said, adding, "the data dictionary has enabled us to manage what is our major business. It is for us a corporate data base."

'Mammoth' System

Recognizing the dictionary as a potentially mammoth management information system, ABS decided to monitor, control and progressively stage any dictionary implementation, Palmer said.

"Not only do we see a phased implementation for which to believe Adabas with its high level of flexibility and data independence is ideal, but we also see a need to adhere to several systems objectives that impact the architecture of the ABS dictionary enhancements," he added.

To remain in a position to capitalize on dictionary-based improvements to Software AG's data base products, it was felt necessary to make the basis of development the Adabas data dictionary, Palmer said.

ABS did not use all of the data dictionary record types, he said. Modification of supplied programs has been avoided and supplied utilities are used where appropriate, with new programs written in Natural and PL/I to address the combined set of files, Palmer explained.

"Our main concern," he stressed, "is the degree of compatibility between the current Adabas data dictionary file and the structures that might replace it under the Software AG rethink of the dictionary."

Software AG discussed its plans for a new data dictionary at the conference, and Palmer noted that it appears to be a completely new product. This will present problems for users such as ABS with extensions added to the current data dictionary. "We are going to have decisions to make regarding its usage," Palmer said.

He explained that the update system supplied with the Adabas data dictionary was not considered satisfactory for ABS' needs. The organization also was unable to wait for the future release by Software AG of an On-Line Update feature.

Split Functions

ABS has used a decentralized data base administration approach with a splitting of functions. The decentralized component is carried out by a User Data Base Administrator. The organizational implications of User Data Base Administration are related to User Data Management.

There are five additional files implemented for the ABS extension and the Adabas data dictionary file split into separate dictionary and system files. Two new record types, logical data base and record format, also have been introduced into the Adabas data dictionary file, Palmer explained.

A major objective of the dictionary, according to Palmer, is to provide the degree of distributed control that this strategy requires.

The JOL is used to enable ABS to write macros to control various functions, Palmer said. These go to the dictionary and pull out information necessary for specific areas. The macro capability can nest job procedures to any depth, he said. It also enables the user to invoke Cobol and PL/I programs.

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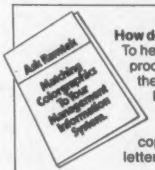

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When Many Applications Interact

Steps to Shared Data Base Success Outlined

By Lois Paul
CW Staff

INNISBROOK, Fla. — Planning, controls and management commitment and involvement are the keys to building a successful data base-oriented environment where a large percentage of applications interact and share a common data base.

This was the major point expressed by Harold Uhrbach of DBD Systems, Inc. in a presentation entitled "Organizational Implications of Data Base" before Software AG's International User Group's meeting here recently.

In the traditional environment, each designer was left to his own devices, Uhrbach explained, and this resulted in data structures designed for that person's optimum requirements, but which will not help any subsequent user.

The need for a centralized function became obvious, he said, and this resulted in the data base administration function.

Data Management

The objective of the overall data administration function is to establish policy for managing data, Uhrbach continued. This function includes the establishment of data resources management policy, resolution of data-related conflicts, assurance of data integrity and user liaison with the data base.

"In most organizations, I have not seen an active, functioning, effective data administration function," Uhrbach said, citing as exceptions government installations such as the Pentagon.

As organizations recognized the importance of a central management of the data base resources, this function began to move out of DP, he said. Generally, it is an independent group reporting to the executive suite intended to support a central data resource and to manage, coordinate and control these resources.

These functions are organized under staff, control and design categories, according to Uhrbach. Staff or centralized functions are performed once and include planning of the data base environment, documentation of the data base and establishment of procedures for security and recovery of data.

Control mechanisms include review and approval of the data base design and application systems design, review of the data base management system (DBMS) commands, assurance of the integrity of the data base and monitoring of usage of the data base.

The data base administration function also is responsible for designing the data base relative to a set of application areas, according to Uhrbach. This includes definition of its content and of access to the data base.

Key Question

A key question, he explained, is the placement of the data administration function within an organization. This depends upon the type of organization (regarding whether information is its primary service or information systems are used to support its primary function); the type of DP function (service bureau or integrated staff); and general characteristics, such as size, use of centralized or decentralized DP and whether it is multifunctional and national.

Generally speaking, the data administration function is within the DP department today, rather than external to it, he said. In the most common structure, the organizational entity called data administration is within DP, with a data base administration and data control administration group reporting to it.

Within DP, however, the data base administration function should be an independent group on an equal basis with system development, programming and operations, Uhrbach stressed. If the data base administration function is external to DP it should be at the executive level of the organization, where it interfaces with a management advisory group.

If there is no overall data administration function, the subsidiary data base administration should consist of partly staff, partly line functions. Successful data base administration groups began with a few people, concentrated on building the data dictionary and offering design assistance to users and eventually built credibility that made their authority more effective, Uhrbach said.

In a distributed data base administration environment, staff and control categories are performed only once at a centralized corporate level, and design functions are performed at the system development sites. It should be treated as one data base organization that happens to exist at several nodes, Uhrbach said, noting that he has not seen it work effectively any other way.

The data base administration function exists to help and should be a "benevolent despot" rather than a "data czar," Uhrbach said, exerting its authority only as necessary. It essentially manages the information flow and provides an interface with operating departments.

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AI Seen Zeroing In on Logic of American Law

By Brad Schultz
CW Staff

CHICAGO — Systems with artificial intelligence (AI) may literally show the logic of American law for what it is and recommend optimum strategies for using the law to reach a corporation's financial objectives.

So said recent National Computer Conference panelists here at a session on legal applications of AI, which is the branch of computer science trying to give computer systems cognitive powers only the human mind seems to have exercised on Earth.

Over the past dozen years, many AI researchers have focused on applications in medicine — building systems that diagnose and prognose for patients, given some data on symptoms and how human physicians have treated similar symptoms in the past.

More recently, AI specialists have tackled the domain of attorneys, who like physicians reckon prudent approaches to helping distressed clients by considering how peers have dealt with similar situations and by applying rules of practice in which their profession has confidence.

Rules, as expressed in formalisms of logic that computers obey, are what AI systems manipulate to assist humans in handling complex problems or to simulate normal human faculties such as vision and movement of physical objects.

Jurisprudence is a human activity especially rich in rules, the conference panelists noted. These rules may be implicit in verbose legal documents and statutes, but by constraining the destinies of humans, corporations and governments, they may be fodder for some of the most influential computer applications of the next decade.

Conceptual Operation

AI systems operate on concepts, not merely words and numbers, Dr. Carole D. Hafner of General Motors Laboratories told the session. Legal applications of AI demonstrate the conceptual interrelationships of statutes, she explained, allowing attorneys to swiftly retrieve those statutes pertinent to a particular case.

Prof. Jeffrey Meldman of MIT's Sloan School of Management observed that "law is an especially rich domain" for AI research because it is "highly structured modeling out of operational necessity." Lawmakers are compelled to compartmentalize and simplify jurisprudence so it fits complex realities of human behavior, he said.

Thus, legal text is simpler to translate into AI computer programs than text of many other disciplines. Rutgers University professor N.S. Sridharan noted that AI systems employ metarules to resolve conflicts when two laws, or portions of a law, logically contradict each other.

Sridharan and L. Thorne McCarty created Taxman I, an AI system "capable of representing the full set of facts of an actual corporate tax case," and are now working on Taxman II "to develop a cognitive theory of the patterns of argument adopted by lawyers and judges in the early years of the corporate tax code." McCarty is a law professor at the State University of New York, Buffalo.

The Rand Corp.'s D.A. Waterman and Mark Peterson described their Legal Decision-Making System (LDS), which shows how attorneys settle civil suits and how settlements are affected by changes in the legal system. LDS easily handles product liability cases for which thousands of rules describe pertinent law and strategies of litigation, they said.

Warm Welcome?

Will the legal community welcome such AI systems? According to Meldman, some lawyers and judges will resist the coming technology. Other attorneys on the panel agreed that systems may prove popular as behind-the-scenes tools, but also agreed that courts may question their applicability for such purposes as verifying — at the appellate level — the validity of lower court rulings, motions and testimony.

For what are usually minor legal tasks, such as will writing, AI systems are already proving successful, the American Bar Foundation's James A. Sprowl pointed out. But legal applications of AI will not jeopardize the jobs of attorneys, nor will medical applications threaten physicians, emphasized the London School of Economics' Dr. Sandra Cook. Instead, AI will simplify certain functions those professionals fulfill, she said.

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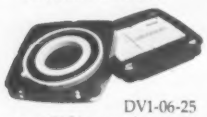
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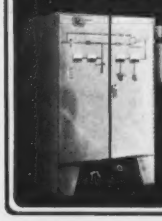

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Development Tool Eases Firm's Data Base Upgrade

By Marguerite Zientara
CW Staff

MICHIGAN CITY, Ind. — Better communication between data base analysts and system designers, more efficient use of man-hours and less effort at project tracking are said to have resulted from the use of a systems development software package by a machinery manufacturer here.

In late 1978, Joy Manufacturing Co. began a migration to an on-line data base system from a batch data base environment. The group now has an IBM 370/148 running under DOS/VSE and using IBM's DL/I data base package with the ICCF interactive editing and communications system. This migration produced a rapid increase in the work load at all levels.

"As the work load increased at a faster pace than manpower, the need for an organized method of producing efficient systems and documentation became apparent," recalled Paul Taylor, data base analyst for the firm. After scouting the market, Joy settled on Atlantic Software, Inc.'s SDM/70 package to fill the need.

While applying SDM/70 to the departmental needs of data processing and systems development, "we discovered that it could also be used as a complete system for data base development and maintenance," Taylor explained.

The approach used in contouring SDM/70 to meet the needs of data base development was to define the phases used in construction of a data base and match them with the corresponding SDM/70 phases and tasks. Many of the SDM/70 tasks did not apply.

Development Enhanced

However, a majority of the tasks not only applied, but enhanced normal development by producing an end result of a fully documented, more efficient data base, according to Taylor. A total of 26 data base development steps were found to use 37 SDM/70 tasks, scattered throughout the phases. The number of SDM/70 tasks used varied with the development steps required.

The immediate benefits were the improved communication and productivity mentioned above and a smoother transition from testing to implementation. As development passed through the phases of system requirements definition, system design objectives and systems external specifications, the questions posed by SDM/70 required consideration of problems that normally are not taken seriously until the projects are finished and put into production.

Coding of data base descriptions proved much easier because of the information already assembled by previous SDM/70 tasks, Taylor observed.

Philadelphia Eyes Mapping Link For City Offices, Utility Firms

By Deborah Wise
CW Staff

PHILADELPHIA — The managing director's office of the city of Philadelphia wants to use a computerized system of large-scale mapping to tie together different city administrative offices and public and private utility companies that use the same kinds of data.

On April 13-14, 200 planners, surveyors, computer programmers and administrators met to review a pilot project conducted over the last two years in Norristown, Pa.

The meeting "was to establish a broader base of support for the concept," according to Craig Schelter, acting executive director of the planning commission. To do that, the project, known as Regional Mapping and Land Records (RMLR), has to be seen to be cost-effective.

"I don't think the cost benefits are clear at this time," Schelter said. "Nowadays, we spend a lot of money on time-sharing facilities and what we hope RMLR will do is make the data available in a nonprofit data center that would be more cost-efficient."

The idea is to gather data required by utility companies and government administrative offices such as property identifications; information on tax assessment, utility hookups and zoning; tax delinquency data; and dimensions of streets and sidewalks.

The funding for the data collection and management would be shared on a nonprofit basis by the people who would use it.

Craig called this concept an "invisible service" that will be hard to sell when visible services such as food stamps and schools are being cut from the city's budget.

The Norristown pilot project was carried out as a vendor demonstration by Bernon Graphics, a New York-based company.

A mixed rural, suburban and urban area of 50 square miles was chosen to demonstrate the possibilities of mapping and digitization and to explore the possibility of cooperation between utilities, corporations and local government, according to Joseph McLaughlin, administrator for the Planning Commission of Philadelphia.

"The pilot worked very well," McLaughlin said. "What we are now exploring is a pilot for the city of Philadelphia."

McLaughlin anticipated that it would take between four and five years to complete a full-scale project for Philadelphia.

As far as equipment for the Philadelphia pilot is concerned, McLaughlin said they would be using flat-bed plotters, digitizers and many CRT terminals; however, vendors had not yet been approached.

So far, the city of Philadelphia has made no financial commitment to the RMLR project. The project has been endorsed by Philadelphia Electric Corp., which would be one of the major users.

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Larry Long's List of Professional Societies

• ADMINISTRATIVE MANAGEMENT SOCIETY (AMS)

Purpose and Objectives: Headquartered in Willow Grove, Pa., the AMS is a professional management association serving 12,000 members in 145 chapters throughout the U.S. and Canada. It is dedicated to furthering the professional development opportunities of its members and to enhance and promote the common professional goals of persons involved or interested in management.

AMS serves management in business, industry and government through a variety of publications, salary and business surveys, a professional certification program, plus educational meetings and conferences.

Management World, the society's monthly magazine, features articles, news and columns on timely management topics and issues. In addi-

In addition, AMS publishes *Impact: Information Technology,* a monthly newsletter that explores management's present and future responsibilities in the area of automated office systems.

Each May AMS sponsors an international conference with two days devoted to technical and workshop sessions covering areas relevant to increasing managerial productivity.

For More Information: B.J. Slack, Administrative Management Society, 2360 Maryland Road, Willow Grove, Pa. 19090.

• AMERICAN ASSOCIATION OF PUBLIC WELFARE INFORMATION SYSTEMS MANAGEMENT (AAPW/ISM)

Purpose and Objectives: The purpose of the American Association of Public Welfare/Information Systems Management, an affiliate of the American Public Welfare Association, is to promote the exchange of knowledge and stimulate the interest of systems management, information sciences and electronic data processing in public welfare agencies and related programs.

Regular (voting) membership of AAPW/ISM is open to all individual members of APWA with responsibilities at the professional, administrative, systems management and data processing levels in or for state, local and private agencies administering public welfare programs.

Associate membership (nonvoting) is open to all individual members of APWA who are users of electronic data systems in agencies administering public welfare programs or nonpublic agency personnel interested or involved in assisting the administration of public welfare programs.

The American Public Welfare Association is a nonprofit membership organization involved in promoting positive social policy and effective manageable welfare programs at the state and local level.

For More Information: Mindy C. Fast, Senior Policy Analyst, 1125 15 St. N.W., Washington, D.C. 20005.

• ASSOCIATION OF SMALL COMPUTER USERS IN EDUCATION (Ascue)

Purpose and Objectives: Ascue encourages appropriate uses of computing equipment and techniques for the improvement of its member institutions. Ascue supplies its members with information on the most current data processing methods through its annual summer conference and a newsletter as well as assisting in solving individual problems and promoting cooperation among members in the utilization of various small computers.

Ascue cooperates with manufacturers, distributors and suppliers in establishing and maintaining proper technical standards and in meeting new needs for special devices and systems. Ascue is dedicated to the service of education through the use of small computers and open to all.

For More Information: Jan Carver, Ascue, Secretary, Chatham College, Pittsburgh, Pa. 15232.

• CAUSE

Purpose and Objectives: Cause is the professional association for individuals engaged in the development, use and management of information systems in higher education. Cause membership includes 1,300 members on 500 campuses representing 350 colleges and universities and several sustaining companies.

Cause objectives include enhanced administration in colleges and universities through the use of computer-based information systems; exchange of information for promoting effective development, use and management of such information systems; and the communication of concepts, issues and problems relating to higher education information systems.

Cause publishes *Cause/Effect,* a bimonthly professional magazine.

For More Information: Charles R. Thomas, Executive Director, Cause National Office, 737 29 St., Boulder, Colo. 80303.

Larry Long is compiling a list of professional DP/computer societies and organizations. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, Box 880, Framingham, Mass. 01701.

THE DO-IT-YOURSELF

If you use ASCII terminals in your business, you'll be interested in the high quality of the IBM 3101 display terminal. You choose from two basic configurations, which range in price from $1,295 to $1,520. Both of these terminals connect to most business computer systems, be they IBM or not. You order the 3101 with just one phone call and can get delivery as soon as 45 days. To top it off, you get the high quality, performance and dependability you expect from IBM.
Read on to find out more about this remarkable ASCII terminal.

Save up to 20%

Volume procurements can save you up to twenty percent for either of the two configurations of the IBM 3101. One configuration, with character transmission, lets you use it like a teletypewriter. The other has selectable character or block transmission. In block transmission, it provides sophisticated editing capabilities such as insert/delete and full cursor control, along with field functions like blinking, high intensity and protected fields.

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Accessible setup switches allow do-it-yourself selection, such as line speed, parity, scroll and reverse video. And since the IBM 3101 weighs 38 pounds, you can move it easily.

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The 3101 lets you decide what's best for you. The 12-inch diagonal screen can be swiveled and tilted to cut interference from overhead lighting. Display the maximum of 1,920 characters in 24 lines and you'll see they're as distinct in the corners as in the center of the screen.

The keyboard is moveable, so you can angle it to the screen to suit your comfort and eyesight.

The keyboard looks familiar because it's much like the IBM Selectric.™ The 87 keys include a numeric keypad, graphic character keys, cursor positioning controls and dished home-row keys for touch typists. And the keytops are textured to reduce glare.

Diagnose malfunctions yourself

The terminal is designed to help you troubleshoot problems. The cause of equipment failure is displayed on the screen, using the twenty-fifth line. If you then follow simple instructions, you can generally isolate the source of the problem and correct it. If the equipment has a malfunction that can't be fixed in this way, the modular design of the 3101 lets you replace any of the three elements–video, keyboard and logic-

Should DP Be In on WP Buys?

Q Our department, by volume, utilizes the computer center more than the rest of the company combined. We are now considering the purchase of word processing (WP) equipment and I've met with representatives of five different vendors. Although the equipment costs vary considerably, the capabilities appear to be about the same. I mentioned to one vendor that I would like to invite someone from our DP department in to talk with him about his equipment. He became defensive and said that was unnecessary and that I was capable of making an informed decision.

Do you feel it appropriate for DP personnel to be involved in decisions that involve only my budget?

A On this particular item, yes. Although a cleverly coined term, word processing is no more than another application system for computer-based data manipulation and information retrieval. In order to ensure compatibility with existing corporate computing hardware and other word processing hardware, the DP department should be involved.

In order to establish a framework by which the DP department can assist, and perhaps coordinate, the implementation of word processing systems, a DP/user committee should be formed to set policy and standards for the acquisition and installation of these systems.

Turnaround Time
By Larry E. Long

Q By now hundreds of trivia lovers have corrected the "numbers of tapes" formula that you published in Turnaround Time. Anyway, here is my nominee for a better formula:

$$\text{number of tapes per file} = \frac{N}{T}\left[\frac{R}{B} + \frac{I}{F}\right]$$

The formula is slightly less cumbersome than the published one.

A Although both yield the same answer, your version is indeed less cumbersome to use. For the benefit of those who might wish to use your formula, the variables are record length in bytes (R); tape bit/in. (B); blocking factor (F); number of records (N); tape length in inches (T); and interblock gap length in inches (I).

Q Where is a good source of information for developing very specific and detailed computer operations job descriptions? I would want to include tape librarian, peripheral, console and senior console operators.

A I am reluctant to recommend a single source. A half dozen books present reasonable examples of classical DP position descriptions (PD). These and other sources (primarily periodicals and other companies) can provide input, but a position description should reflect the position as it relates to your company. For example, you would think that a tape librarian PD would be straightforward, but I can't recall two such positions with the same scope of responsibility. Available PDs can provide insight, but should be used sparingly for content.

There is a danger in developing "very specific and detailed" PDs, especially in operations. A PD should provide enough flexibility so persons with different titles can help one another during times of heavy activity.

If your company does not have a general format for PDs, the following format has a good track record:

- Position title. Roughly descriptive of duties.
- Position code. For ease of accounting; description of function (becomes more general as position responsibility increases).
- Responsibility. For management information systems operational areas and other position titles.
- Interaction. Formal and informal interactions with persons within and external to the company.
- Standing committees. Those committees for which the position is a permanent or rotating member.
- Position requirements. Education and experience prerequisites.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, *Box 880, Framingham, Mass. 01701.*

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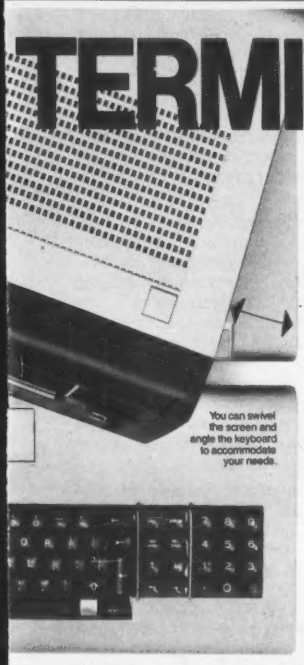

while you send the faulty element to an IBM repair center for prompt service.

Out of the carton and into operation

Setup is do-it-yourself. You place the video on top of the logic element, connect the keyboard and video element and plug in the 3101. Then you simply use the appropriate setup switches to select the desired mode of operation.

Do-it-yourself printout too

You can also get a copy of the information that you see displayed on the IBM 3101 with the IBM 3102 printer. A small, non-impact buffered printer, it attaches to the IBM 3101 and is just as simple to set up.

You also get diagnostic functions so you can troubleshoot the IBM 3102 printer yourself. The purchase price for this printer is $1,295, which makes hard copy economical. And ask about our volume pricing.

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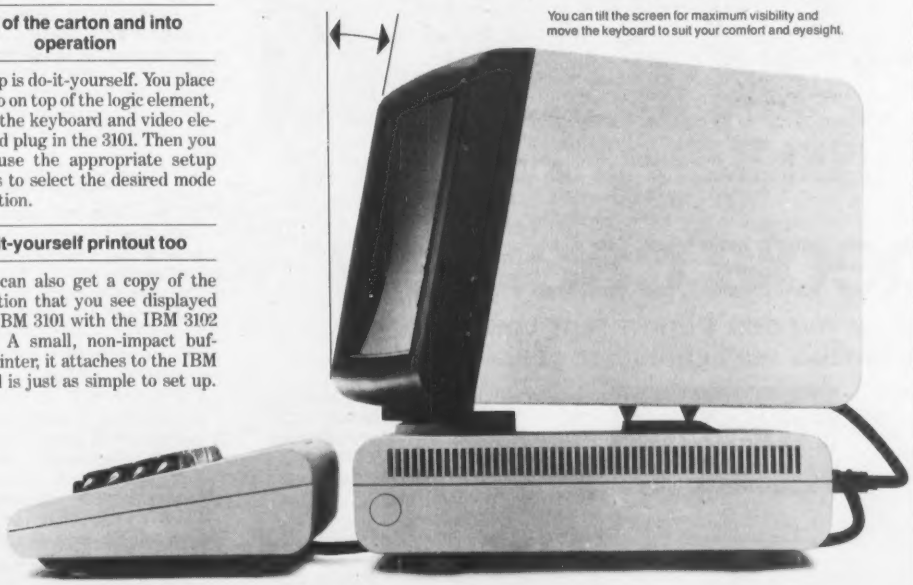


Cobol Generator Eases Programmer Monotony

PITTSBURGH, Pa. — A Cobol generation system has removed much of the monotony of writing and debugging code for programmers at the U.S. Division of General Refractories, Inc.

Rich Gennuso, supervisor of programming and financial systems for the firm, noted that when highly trained Cobol programmers are expected to manually write and debug Cobol programs all day, they become bored, feel unchallenged and are less productive

After adding Phoenix Systems, Inc.'s System-80 Cobol generation system, Gennuso said he no longer has these problems because "we do not have just program coders anymore. Instead, we spend more of our time on the creative, analytical work that makes the job interesting," he said.

In addition to an increase in the number of lines of code generated in a single day, General Refractories now has Cobol that is standardized and transportable from one computer to another, regardless of manufacturer, Gennuso explained.

This has been important, he said, because General Refractories operates an IBM 4341 host computer at its corporate headquarters in Philadelphia, while Gennuso is running a Data General Corp. Eclipse C-350 system in Pittsburgh.

"Ten different manufacturing facilities are hooked into our Eclipse via DG CS-40 machines, and the ability to take our programs, generated on the Eclipse, and move them to the lower CS-40s or to the IBM 4341 was definitely a factor in our purchase decision," he said.

Gennuso maintained that System-80 was most helpful to his department during its conversion from a Datapoint Corp. system to the current DG equipment, while the parent company in Philadelphia was converting from NCR Corp. equipment to an IBM system.

"Since we are responsible for our applications on that host computer as well as our own Pittsburgh applications, we were effectively going through two conversions at once," he said.

Tight Deadline

His department had been given a tight conversion deadline that IBM said would be difficult to meet. Within three months, all standard data entry programs were to be converted to on-line data entry programs. "When I say convert, I mean we literally rewrote all our programs," he continued.

"System-80 was a tremendous help as we completely rewrote data entry applications for order entry, billing, sales and product file updates," he said, adding, "we could not have begun to do it all by manually rewriting code and certainly not within our time frame." Using System-80, the conversion was completed in three months.

Some DP professionals hesitate to buy a generator because they feel it cannot do everything a programmer can do, Gennuso said. "I disagree with their thinking because I'd much rather take code, which has been automatically generated and is close to what I want, and modify it, than start from scratch, writing programs line by line."

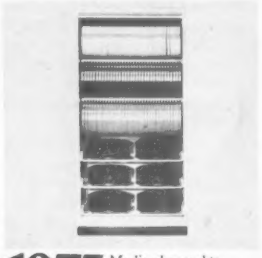
He continued, "If a generator can give me 80% to 85% percent of the code I need in a quarter of the time it would take me to produce it, the time I've saved more than justifies the use of a generator."

Maintenance Aid

The standardization of computer-generated code also assists maintenance and documentation, Gennuso added. "There are no more unique programming styles; everyone's code is the same. If one project member is reassigned, another can pick up where he or she left off."

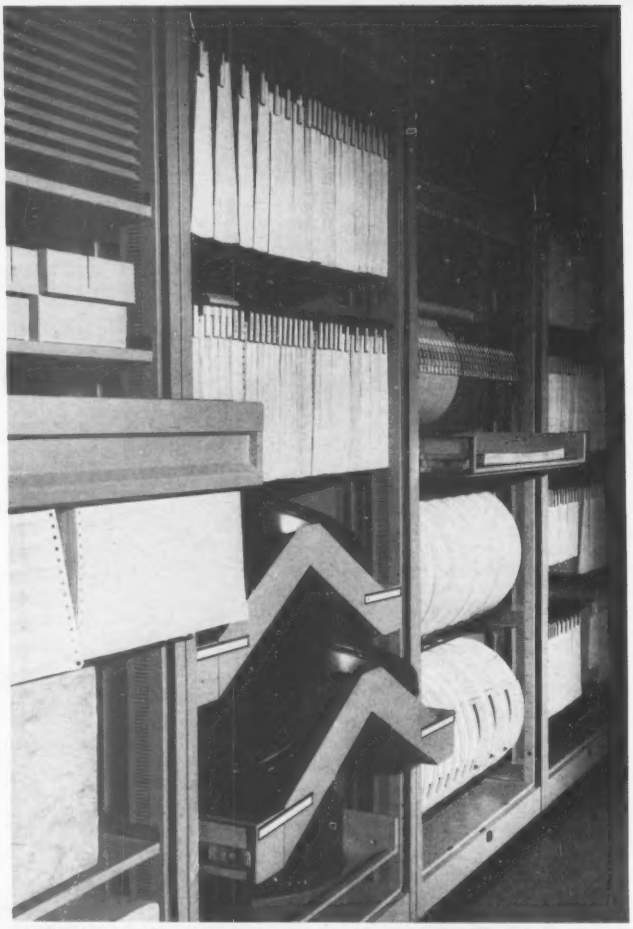
According to Gennuso, use of System-80 has doubled his staff's productivity for on-line screen entry programs. Three of the department's five programmer/analysts are using System-80 after requiring about a day of training, he said.

1972 Bought first Optimedia cabinets to file remaining punch cards, 1316 disc packs and reels of 1600 BPI tape.



1975 Media changed to include 3336 packs in addition to tape. Cabinets reconfigured, new cabinets added.

1978 New system required 3348 disks but no tape. Manuals and run books added. Cabinets again adapted to needs.



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INFORMATION ENGINEERING

By Clive Finkelstein

Part 3: Information Analysis: Developing A Corporate Model

This is the third of six articles on information engineering, a planning methodology for developing corporate data models. It is intended for users and management with no computer experience. Information engineering provides formal DP methodologies for data analysis, data base design and synthesis of program specifications.

The articles cover the following topics: (1) information engineering methodologies, (2) developing a corporate data model, (3) information analysis, (4) data analysis and data base design, (5) procedure formation and (6) information engineering development.

Information analysis enables an organization to understand more effectively its current business by examining, identifying and documenting the data required to support decision making. It assists an organization in planning for the future by identifying and documenting the data that may be necessary to support future products, services, markets and channels.

It stabilizes the identified data so that future changes to the organization will not cause a major redefinition and restructuring of that data. It provides a facility where user personnel can convey their exact requirements to DP personnel for all application systems that are to be automated. Requirements are presented in a form that is precise, unambiguous and easily understood by both the user initiators and recipient DP staff.

Information analysis verifies that the written strategic statements — the purpose and mission statement; the description of products, services, markets and channels; the corporate and unit objectives — are an accurate representation of the available data within the organization.

Figures 1 and 2 on Page 30 show the main stages of information analysis.

Information Discovery Phase

The output of **Stage 1** (initial data identification) is an initial data model and identification of key data subjects in a subject list. Relevant data attributes are grouped within those data subjects.

Stage 2 (functional area data modeling) expands these data subjects into a data entity list, incorporating additional data identified from a functional area perspective. This additional data is also incorporated in the evolving data model schematic.

Stage 3 (unit objectives data extension) expands both still further. It extends the data model and entity list based on measurement of established corporate and unit objectives.

Stage 4 (current data examination) examines the data used by current systems in source documents, manual ledgers, reports, inquiries and so on. It produces a data model that is compared (in Stage 5) with the data model developed during Stages 1 through 3.

The data (entities, attributes and associations) identified during these stages is formally documented in a data dictionary. This is an important advantage of information analysis: It provides a formal methodology for definition of data to be managed by a data dictionary.

Data Consolidation Phase

Stage 5 (functional area integration) combines the data models developed in Stages 1 through 3, based on the strategic direction, with the data model from Stage 4, based on current systems.

Stage 6 (data conflict resolution) resolves data conflicts and defines accountability for that data which is shared across several functional areas. A series of cross-checks quality test the ability of the data model to meet the needs of both today and tomorrow.

Stage 7 (formal normalization) produces a third normal form (TNF) entity list and a TNF data model derived from that TNF entity list. This TNF data model permits a cross-check of the evolved data model

(Continued on Page 30)

IN DEPTH

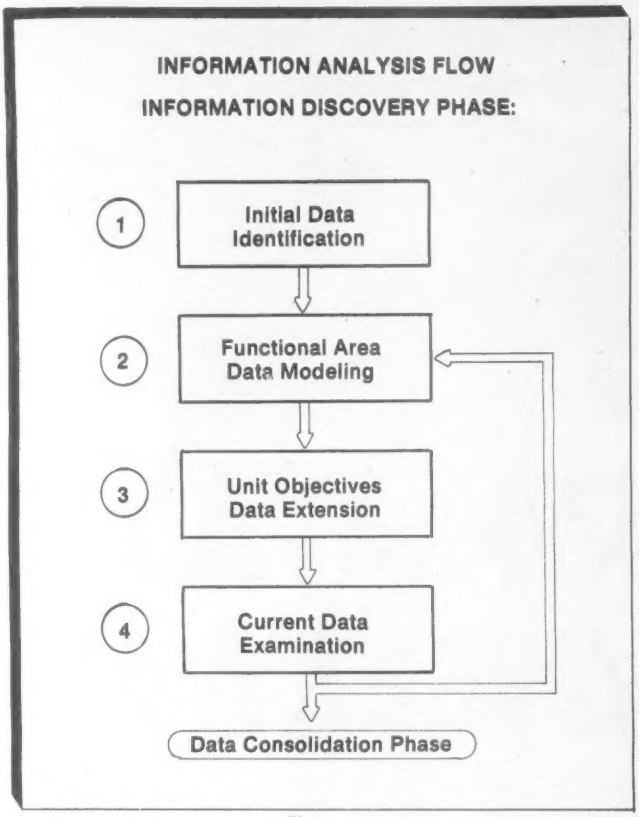

Figure 1

(Continued from Page 29)

from Stages 1 through 6 and Page 29. This is carried out in **Stage 8** (final quality test). Differences between the two data models are resolved. The final data model and TNF entity list are then incorporated in the data dictionary. The result is a TNF data dictionary.

Figure 3 on Page 32 illustrates evolution of the data model through the stages of information discovery and data consolidation.

Figure 4 on Page 33 illustrates a typical final data model for an organization following data consolidation. The data of interest to top management in the corporate data base is shown within the solid lines. Data of interest to other business units, such as distribution, manufacturing and finance, can be similarly delineated.

The high degree of data integration in a corporate data base is apparent. The ability for each business unit to use its data still remains. Some of the benefits resulting from information analysis are listed in the box on Page 32.

Project Team

The success of information analysis depends directly upon an intimate knowledge of the organization now and its direction for the future.

The people with this knowledge are not DP analysts. They are senior managers who are involved in setting the corporate direction. These people have the understanding to help identify the data resource. They communicate this in the strategic statements and may provide direct, personal input to Stage 1: initial data identification.

A project team is established under the control of a senior middle manager, with top management sponsorship and direction. The team may also be comprised of corporate planners, lower level managers and business analysts. DP analysts and project management personnel also form part of the team. The project team may have as few as three members or as many as six or seven.

The most successful information analysis projects are user-driven, with DP representatives taking only a passive role. Their function is to provide general project management and to record data as it is identified.

In the early stages of the project, initial input is provided by top management. In the later stages, management and user representatives from different functional areas meet with the team to help identify the data relevant to those areas. The scheduling of such outside involvement and coordination of the activities involved

(Continued on Page 32)

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"Yes, that's right. With Protocol's 1067 Converter."

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"That's right. And your IBM 3101 ASCII CRT would operate on a SNA/SDLC network."

"And our DEC CRT's and our Lear Siegler ADM3?"

"Yes, and your ASCII hard copy terminals, too. . .like the TI 700 series."

"What about our minis and micros?"

"Those, too."

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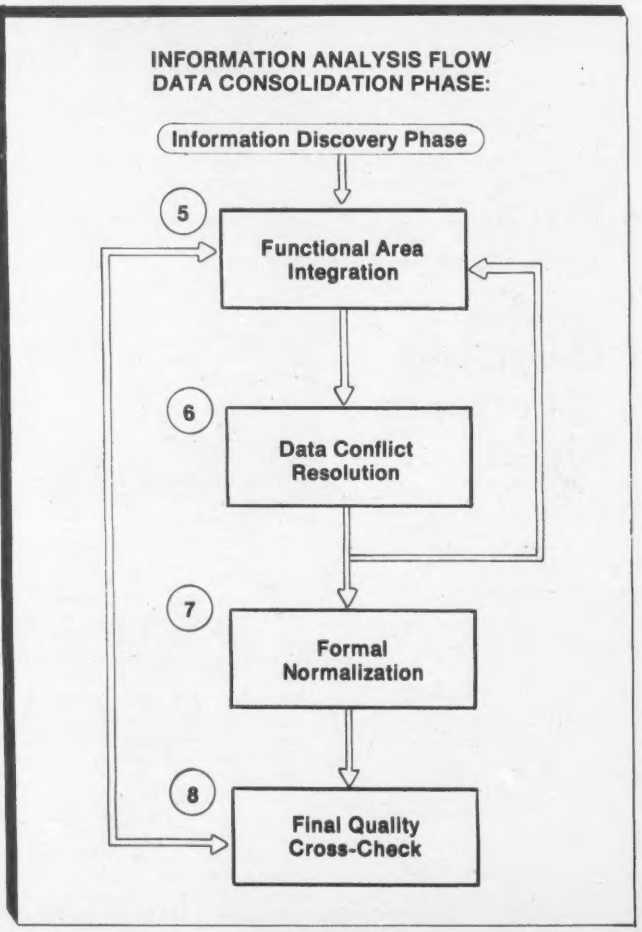
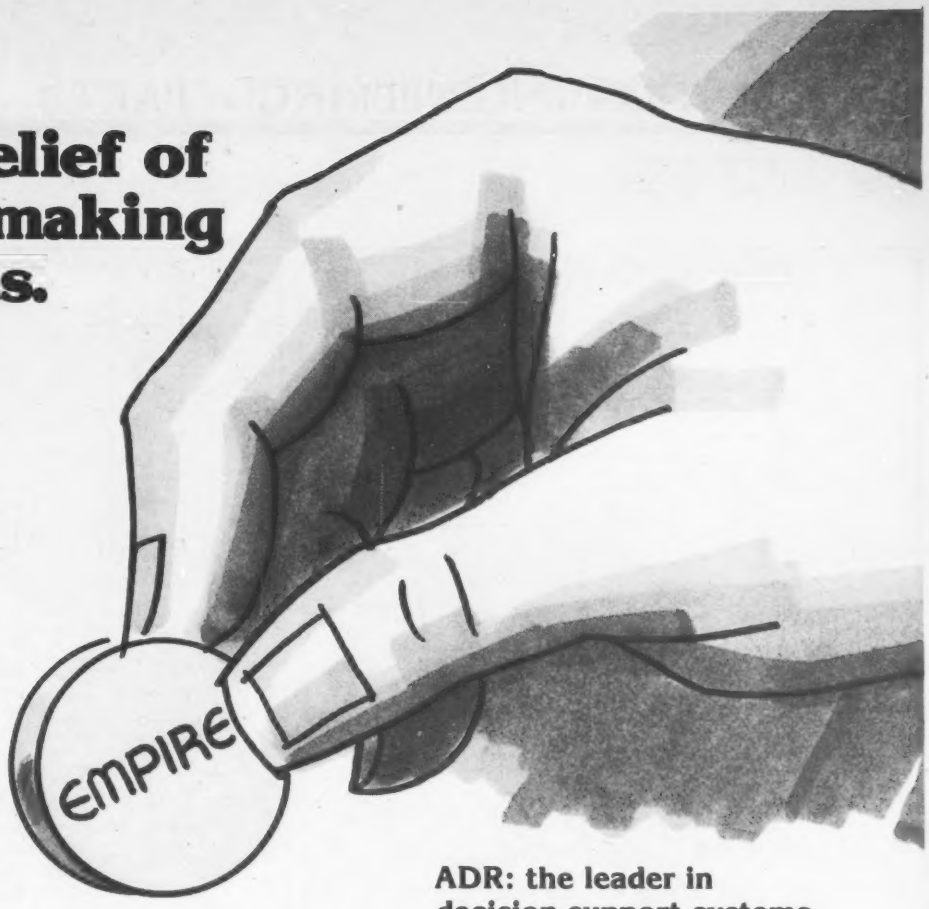


Figure 2

Take two for fast relief of decision-making headaches.



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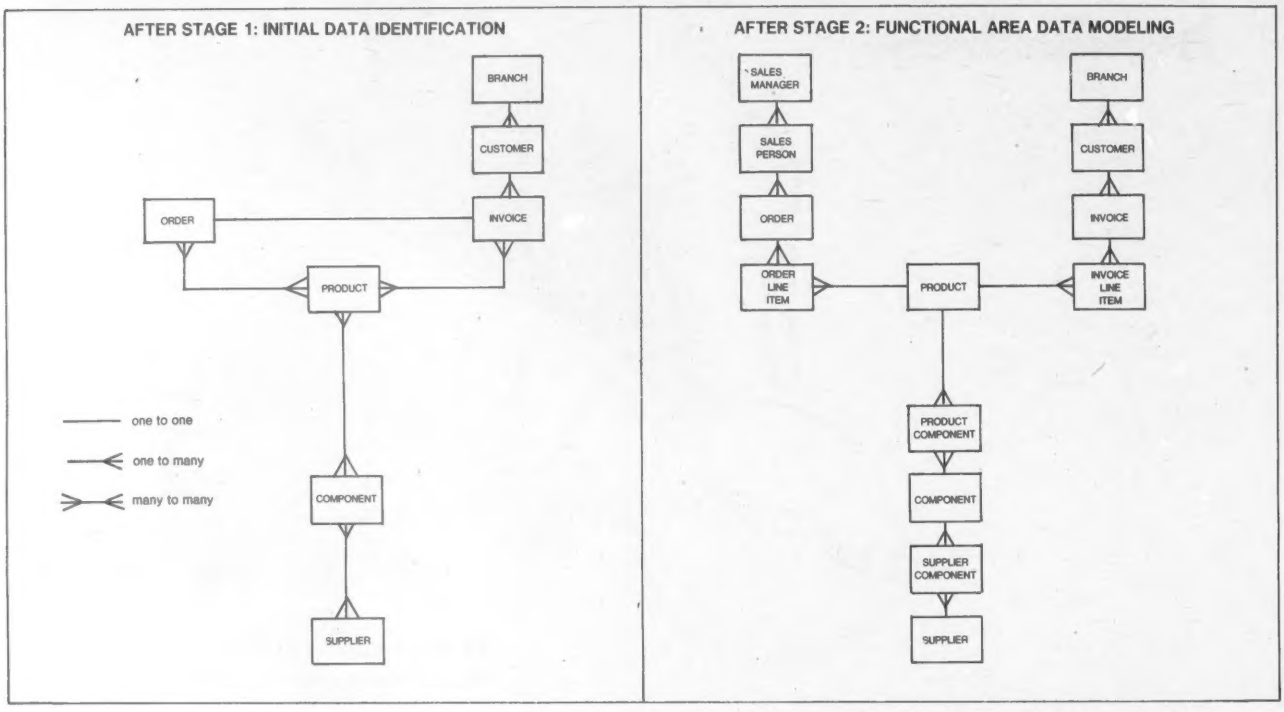


Figure 3: Evolution of Data Model Through Information Discovery . . .

(Continued from Page 30)

during information analysis demand effective project management. This is carried out by the DP personnel on the team.

Session Leader

When information analysis is introduced in an organization, its early success may depend upon someone external to the organization to act as catalyst and session leader. Such an external person must be intimately familiar with the information analysis methodology. This leader would normally be an external consultant. His function is to guide the project team through all stages of the project, drawing on experience with other organizations in the use of information analysis. Possible problem areas can then be identified as they emerge and alternative courses of action suggested.

As information analysis progresses through different parts of the organization and the project team becomes more expert, a senior person on the team may take over this guiding role. The external consultant then provides guidance only through regularly scheduled review sessions.

Some Case Examples

A number of organizations have applied information analysis — in some instances across the entire organization and in other instances in specific areas. The following briefly discusses some representative experience.

A textile manufacturer with turnover of approximately $27 million per year applied information analysis across the entire organization. It was used to enable the firm to take "a complete new look at the company's information requirements."

The information analysis project team was made up of four senior managers (the financial director, the chief accountant, the operations manager and the customer services manager) together with the DP manager and a systems analyst/programmer. An external consultant experienced in information analysis also participated.

The external consultant was felt by senior management to be "imperative," as "far too frequently an in-house team is inclined to look at the way things have been done or are being done, not how they want them in the future. A consultant without the blinkers of past history in the company is well equipped to overcome this problem."

Information analysis was used directly by the senior management representatives on the project team, under guidance of the consultant. The DP representatives provided project management and data recording support.

The project encompassed the entire organization and was carried out over a period of five months. Ideally, the project team should have been full-time. But other responsibilities the senior managers continued to carry meant they were effectively available only 25% of their time. Similarly, the DP representatives were unable to be allocated full-time. In all, the project involved approximately 14 man-months of effort. Data entities and attributes were identified and new procedures were defined using procedure formation.

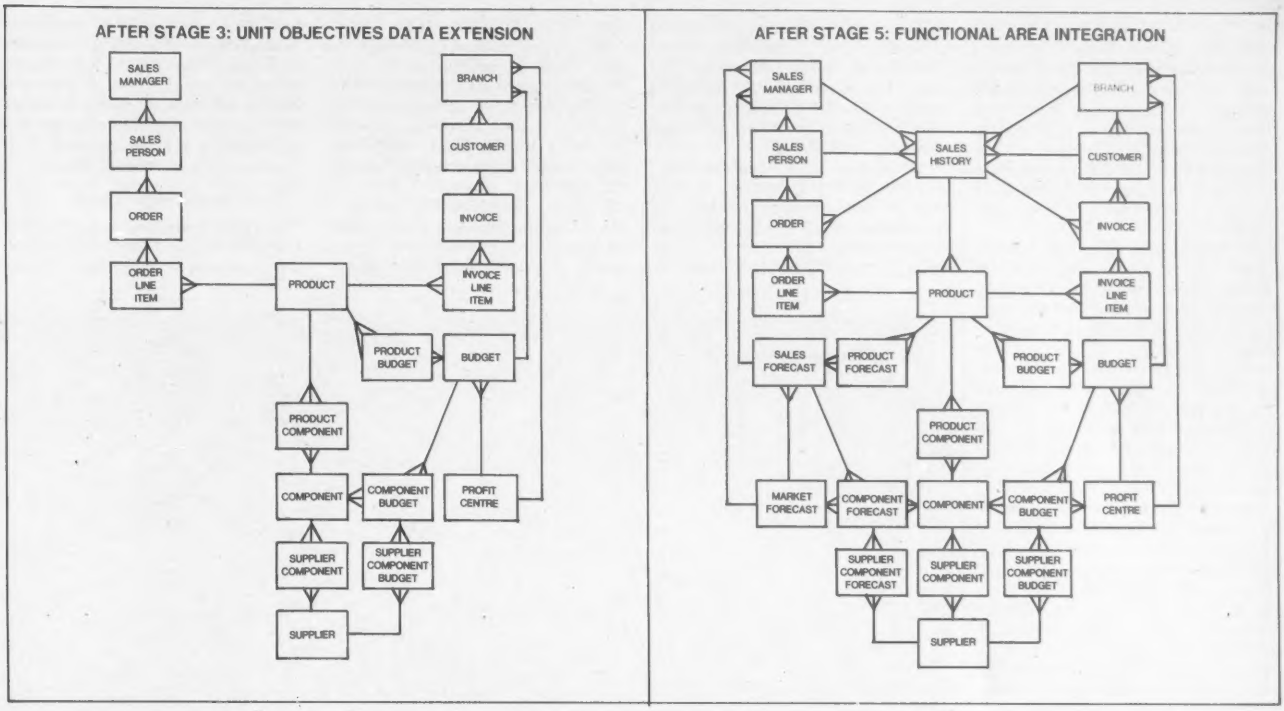
In all, approximately 110 data entities were defined, containing approximately 1,500 data attributes. The resultant corporate data model also included corporate objectives, unit objectives and management objectives and provided a decision support system function.

The project was judged by senior management as being particularly effective. The data model that emerged was "the first time that we have seen the company's information and systems requirements clearly set out in a way that can be easily understood."

Information analysis also provided

Benefits of Information Analysis

- User-driven. It encourages direct involvement by top management in its early stages — identifying that data fundamental to the organization now and in the future (based upon the established strategic direction) and required for effective decision making.
- Does not require computer experience for its application; rather, it demands a detailed understanding of the organization and its direction. This understanding is directly provided by management, users and business analysts.
- Establishes a communication standard between all levels of management, user department personnel and DP personnel. The output from information analysis is an identification of data, documented in a form understandable to all personnel throughout the organization.
- Uses a top-down approach. It first establishes the data fundamental to the mission of that part of the organization being examined. It then progressively identifies the data essential for day-to-day operations (based on an examination of the products, markets and channels). It identifies data necessary for objectives measurement and upon which decision making is based. It provides feedback for evaluation and refinement of strategic direction.
- Data-oriented in its initial application. It results in stable consolidation of data throughout an entire organization (or instead, within an individual application). Subsequent processing of that data is defined through procedure formation (a procedure-oriented information engineering methodology). Information analysis provides direct input to procedure formation.
- Provides a framework upon which a corporate data model may be built. It may be applied at the corporate level based on products, markets and objectives fundamental to the organization as a whole. In conjunction with information requirements planning, benefits and likely costs are identified. Implementation priorities and strategies can be established for different functional area data models.



... And Data Consolidation Phases of Information Analysis

a useful by-product: It introduced a corporate planning discipline that was useful in its own right, as well as in its ability to identify data and processing for integration of manual and automated systems.

A further benefit was realized after the project was complete. When the organization came to select software packages to address its needs, management found that it was "now able to measure quite easily and accurately how closely any software packages line up to our requirements." Senior managers were able to make this evaluation personally.

A Construction Company

Information analysis was applied across the entire organization of a decentralized construction company. This company has an annual turnover of approximately $250 million. It operates in all states and overseas.

This information analysis project was unusual because the project team (for internal political reasons) comprised only one user manager and a DP manager — both allocated full-time. The project, which took six months, addressed the definition of enterprise controls through a decision support system.

A total of approximately 280 data entities were identified, containing approximately 1,100 data attributes.

The organization had previously operated in a centralized batch DP environment. As a result of this project, it became apparent that its needs for the future could be best served by changing to a decentralized operations environment with distributed processing — but with centralized control.

Based on the clear understanding that information analysis had given of the needs for the future, hardware and software specifications were drawn up to address those needs. The result was a far more effective selection of equipment and software than had been feasible in the past. In the selection of software, the ability of various packages to address directly the true needs of the organization could be easily identified.

At the other end of the organizational spectrum, information analysis was used by a large statutory body responsible for marketing dairy products destined for overseas countries. Its annual revenue is approximately $1 billion.

This organization "realized that we needed to analyze the business, its processes and the overall operation as well as identify the links between functions and the degree of dependency between them."

Early in 1979, it explored the applicability of information analysis to its needs. According to the manager, corporate planning and management information systems: "First, because it was a new and different approach, we were somewhat skeptical. Later, however, through our greater understanding of the methodology, it emerged that (information analysis) was not only applicable, but essential if we were to achieve any degree of success with the task we had set ourselves. It quickly became clear that analyzing the business in terms of product, markets and channels — in terms of business rules — allowed us to establish a stable data model because we were able to define it accurately and with understanding across all functional areas."

Data base had been used in the past. But the establishment of a second

(Continued on Page 34)

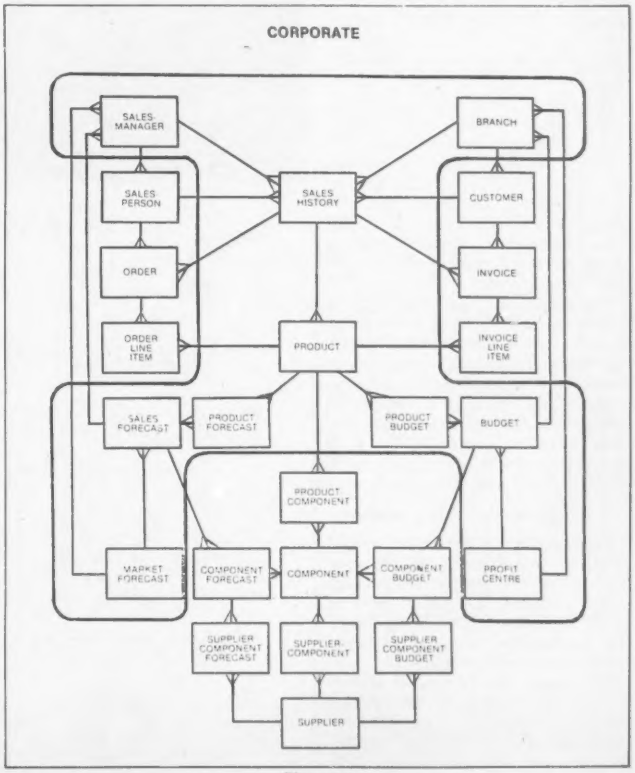


Figure 4

INFORMATION ENGINEERING – PART 3

IN DEPTH

(Continued from Page 33)

computer center some 300 miles north of the main computer center, with a communications network throughout the country, required a new organizationwide approach to computer-based information systems. A total of 120 data entities were identified, with approximately 2,200 data attributes, over a period of 12 months.

As the corporate planning manager said: "At first, even though we thought that users might need to be involved, we expected that the computer analyst would be able to play a greater part. As it turned out, this was not so. The computer analyst did not know the business in sufficient detail to perform the task of defining entities and data attributes for the model. It was soon clear that users needed to play a much greater role than we had at first envisaged.

"In the early days, the idea definitely needed to be sold to the users. To a large extent this was achieved through both participation by the users and a demonstration of top management commitment. Soon, because of the frequency of the (information analysis) meetings, users became familiar with the functional areas outside their control. A form of communication began to develop, which has helped to create a greater overall understanding of the board and operation of the industry by the people involved. We discovered that there were tentacles of information linking functions and operations which previously we had not realized existed.

"One of the main observations I have of this methodology is that — even if physical implementation does not take place — it is a worthwhile exercise in terms of modeling a business. The benefits become clear as you progress through the project. A better understanding of the organization is gained by more people. The result is that organizationally a company can better change to support its functions."

This organization established a project team on a full-time basis. Some five to seven representatives from different functional areas were brought in as required for information analysis sessions as the project progressed through functional area data modeling (Stage 2). Some 50 functional area representatives were thus involved with the project.

Large Government Department

Information analysis was applied on a pilot project basis, concentrating on the customer service function of a large, multibillion-dollar government department. The functional areas investigated directly employed more than 50,000 people.

The project was conducted mainly under the control of Information Services, staffed by functional managers and officers seconded from the several user divisions which dealt with customers.

The purpose of the project was to determine whether data administration was applicable to this large concern. Could functional managers combine detailed knowledge of their specialty with the abstract thought necessary to model data?

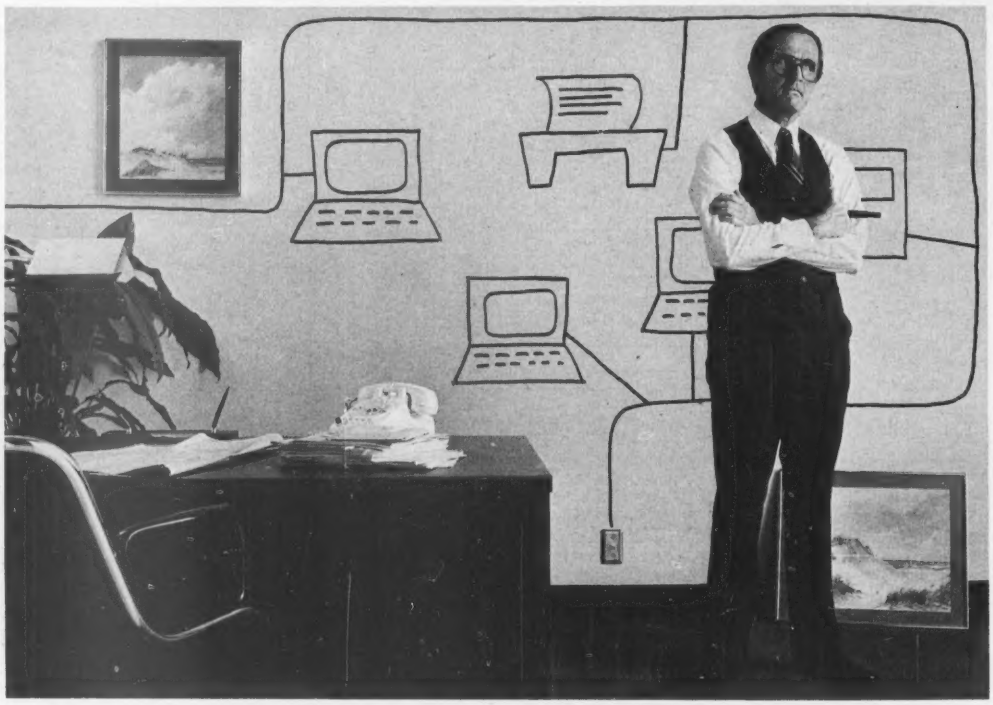
The project team identified and modeled some 110 entities and more than 600 data attributes, crossing the boundaries of 15 functional areas. Supporting clerical staff from the divisions entered this data detail directly into a data dictionary.

The project progressed through the first stages of information analysis. Because it was a pilot project, a fixed schedule of three months was set. Findings to date were then reported to senior management, while the project was frozen awaiting authority to proceed further.

Based on the success of the pilot project, senior management instructed that future development in the customer area should adopt information engineering. The overriding consideration was the tremendous economies offered the whole organization by capturing data once and storing it nonredundantly to satisfy the operational and management needs of the various divisions. This had never been achieved before.

Single Department

Information analysis was applied to a bank's travel department, which was examined as a separate business



We were here three years ago.

in its own right.

In this project, information analysis was applied personally by the allocated systems analyst to identify the data relevant to the department. He interviewed management and users as appropriate, but they did not participate directly.

The application of information analysis in this way involved a total of 30 man-days. Thirty data entities were identified comprising 300 data attributes.

A university used information analysis to develop a data model of its library. This did not involve the academic departments, but instead the library staff and its management as users.

The full-time project team consisted of two librarians (users) and an analyst/programmer. The systems development manager and an information analysis consultant were involved on a part-time basis.

In an elapsed period of 10 weeks, the library examined the data relevant to seven functional areas. This encompassed 65 entities and approximately 350 attributes.

A significant result of this project, according to the users, was the definition of an "intellectual work." A concise definition was essential before computerization was possible. Such a definition had been attempted, unsuccessfully, over a period of many years. Through information analysis, an intellectual work was identified as a network of 12 entities and relevant associations: this permitted the direct representation of any library on a computer.

New Breed

The computer is now regarded as a tool for management. Some organizations are being led by an emerging new breed of top managers who understand how the computer can be applied. They are using information analysis to bring together the many parts of the business so that the computer can mirror the organization.

Information analysis does not assume that only computers can be used. The corporate data model produced by the analysis can be implemented through manual systems, or it may be implemented as a computer-based information system.

These implementation decisions are physical decisions. They should only be made at a much later stage in analysis than is usual today. The most appropriate physical implementation of data (whether in manual ledgers or computer-based information systems, either centralized or distributed) can only be decided based on a proper understanding of all the consequences of that decision.

The new breed of managers recognizes that the data model *is* the organization. They acknowledge the importance of the corporate data resource. They identify that data fundamental to the organization and essential for decision making. In addition, they become personally involved in identifying that data, for they are the people in the organization most qualified to do that. It is their responsibility to chart the course of the organization. And they must make sure they have the information to maintain that course.

However, most organizations cannot have their management personally involved. Acceptance by top management (or strategic management) of its need to be involved in identifying data is an achievement in itself. The direct personal involvement of these managers during information analysis, however, may be totally unrealistic.

Centers on Partnership

Recognizing this, information analysis is based on a partnership between experienced middle management (or tactical management) and business analysts on the one hand and top management (or strategic management) on the other.

Top management provides its support and sponsorship. Middle management and business analysts draw on their understanding and experience in identifying significant data.

Note that DP personnel were not identified in the preceding paragraphs. The DP department in many organizations is too far down the organizational hierarchy to be so directly involved in the corporate planning process.

(Continued on Page 36)

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DATAPOINT

IN DEPTH

(Continued from Page 35)

This will change, for top management now appreciates the contribution the DP department can make. It particularly appreciates the growing need for data administration (as in the past it recognized the need for the administration of personnel and finance — the other two key corporate resources).

We are seeing the emergence of the data administrator: an individual (or department) with the responsibility for managing the corporate data resource. This data administration function will report to the highest management levels.

Application of information analysis draws on the extensive experience of management and users throughout the organization. It identifies data fundamental to the organization. That data must be recorded and managed.

This is best carried out by the data administration staff through the use of a data dictionary, which may be automated. The DP department is responsible for recording that data, when identified, in the data dictionary for later reference. DP personnel carry out this function in an information analysis project. It is their prime responsibility.

Project Management, Control

The magnitude of the task is enormous in many organizations. The Stage 1 data model (initial data identification) can generally be defined within an elapsed time of one to two months. However, the detailed examination, in subsequent stages, of the products, markets and channels, as well as unit objectives relevant to different functional areas, requires much more time (from six to 12 months, depending on complexity).

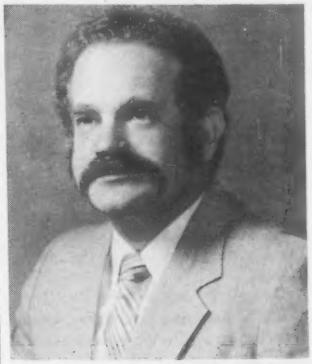
Such an undertaking, involving many managers and users throughout the organization, represents a project of significant magnitude. With such a project, formal project management techniques are essential. This is the second responsibility of DP participants in the information analysis project team: the establishment and maintenance of formal project management.

Infomethod, the information engineering development plan, defines that project management and control essential for success. There are defined deliverables for each information analysis stage, with guidance as to the various cross-checks and quality tests that must be applied. This plan provides a development approach that not only spells out *what* steps are to be taken (at a range of different levels) but also defines *how* the steps are to be performed, *what* the deliverables are and *how* to perform the quality tests.

Through the use of information analysis, the project team representatives quickly gain a detailed awareness of the organization. This understanding previously came only after decades of experience.

These people therefore are able to move into the data administration function. They are the senior managers of tomorrow, having gained enormous experience and top management's attention. Their newly acquired knowledge is enormously valuable to the organization and top management knows it!

Next week: Data analysis and data base design.



Clive Finkelstein has spent 20 years in DP, 15 of which were with IBM in the U.S. and Australia. He founded Infocom Australia in 1976.

His firm is now known as Information Engineering (Aust) Pty. Ltd. and has subsidiaries in New Zealand and the U.S. The latter, known as Information Methods (U.S.A.) Corp., is located in Boston.

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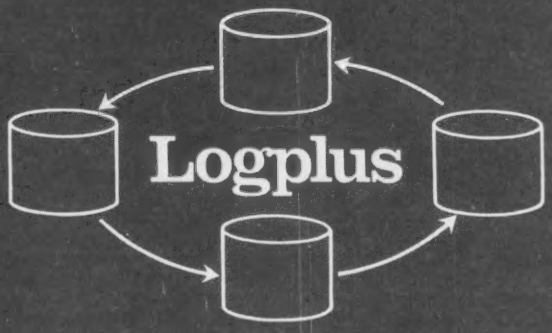

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EDITORIAL

Mixed Blessing

The migration of computer scientists from academia to industrial research centers cannot fail to hurt America's capacity to train future computer scientists and DP professionals. However, its impact on quality of research in computer science may prove a mixture of good and bad.

This migration, blamed on the widening salary differential between academia and industry as well as on lack of funding for university computational facilities, has developed to the extent that most new computer science Ph.D.s do not take professorships on graduation, although more than 600 reportedly were vacant last year. Instead, new Ph.D.s are more apt to take positions at industrial research centers — usually for far more money and without teaching obligations.

Clearly this hurts computer-related educational programs. The migration has progressed while enrollments in computing classes have skyrocketed across the nation.

The nation's capacity to train computing professionals is diminishing during a period when demand for computing professionals is soaring [CW, March 16].

Aside from this serious problem of training, however, the increasing quality of computer science research in industry has its good points. The commitment large corporations are demonstrating to industrial research in computer science may virtually rescue struggling but promising fields such as artificial intelligence (AI) [CW, May 18].

Among large corporations with leading-edge AI research projects under way are General Motors, Dow Chemical Co. and Schlumberger Corp., as well as some well-known information technology vendors, including Xerox Corp. and Bolt Beranek & Newman. Although universities have been the traditional home of important AI research, academic AI projects in the U.S. have usually been subsidized by the Defense Department.

In fact, Defense Department control over the course of AI in American universities has worried people who see Defense and its intelligence community affiliates as adversaries of academic freedom. These critics realize that no field of computer science penetrates studies of human behavior quite like AI. That alarms them because such studies can extend the art of manipulating human behavior.

Social critics may also have reason to worry about what large corporations will do as the new patrons of AI. Their objections to Defense Department involvement will remain relevant to the extent that some large corporations with important AI research activities are also large Defense contractors.

But, on the other hand, industry is giving AI and other computer science fields a much-needed financial boost. Products and services that may come of this patronage could prove quite beneficial to the quality of life.

DATA PAST

Five Years Ago
May 24, 1976

WASHINGTON, D.C. — AT&T had launched a concerted lobbying effort to sell the merits of the Consumer Communications Reform Act to its stockholders and members of Congress. In a letter to stockholders, the corporation had presented its views on why competition and interconnection, fostered by the Federal Communications Commission, were bad for the country in general and the AT&T stockholder in particular.

Ten Years Ago
May 26, 1971

ATLANTIC CITY, N.J. — The 1971 Spring Joint Computer Conference attracted 21,400 attendees and 201 exhibitors.

— — —

ATLANTIC CITY, N.J. — Sen. Sam J. Ervin Jr. (D-N.C.) said computer people must deter government from computer applications that might "adversely" affect constitutional rights.

LETTERS

Opel's Remarks

Computerworld's story on IBM's annual meeting [CW, May 4] erroneously attributed two statements to IBM President John R. Opel in his remarks to shareholders.

First, he did not say, as CW reported, that IBM will release at least one processor aimed at the personal computer market. In his prepared remarks, he said IBM is "interested in exploring" the personal computer market. Later, in answer to a stockholder's question on the timing of the introduction of a personal computer, Mr. Opel said: "We don't forecast when we will or will not announce any future product."

In addition, Mr. Opel did not say, as CW reported, that IBM will slow its internal expansion in efforts to boost dividends. In answer to a stockholder's question, he said the rate of capital expenditures will moderate in about two to three years because of the "cyclical" nature of physical expansion.

Victor J. Goldberg
Vice-President
IBM
Armonk, N.Y.

Role of PSROs

I wish to correct misconceptions regarding the Professional Standards Review Organization (PSRO) program presented in "Regulated or Not, Health-Care Systems Called Recession-Proof" [CW, April 27].

Public Law 92-603 created PSROs in 1972 as peer review programs with the primary goal of monitoring the quality of health care delivered to patients — initially federal patients (Medicare and Medicaid) but ultimately, through PSROs contracting to perform private review, all patients. The program promoted the concept of physicians monitoring one another (peer review) as the means for promoting quality care and reinforcing professional standards.

Only in recent years have PSROs been labeled as cost-containment entities by the Department of Health and Human Services (HHS) and evaluated on a cost-containment basis. The physicians who originally supported local PSRO programs were likely not to have been supportive if the PSRO program's original thrust had been cost containment.

Despite HHS's cost-containment thrust, PSROs have individually continued to emphasize quality of care. How does one place a cost value on a life saved or days of hospitalization not incurred by a patient? The PSRO has promoted performance of needed uncomplicated procedures (example: D&C for Medicaid) on an out-patient basis or recommended a shorter hospitalization (example: lens extraction associated with cataract). This results in optimum patient care and fewer complications, because immobilization of the Medicare-age patient is not prolonged.

Our own PSRO has been involved with these examples in days of patient care saved. However, by using a sophisticated data system as a tool, we have kept our operating costs lower than those of other PSROs without a comparable system available.

Evelyn Koutsos Ross
Associate Executive Director
Montgomery/Bucks PSRO
Blue Bell, Pa.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

READER COMMENTARY Belden Menkus

Off-Site Storage: Preparing for the Worst

John Murray's In Depth article on "Protecting Corporate Data With Off-Site Storage" [CW, March 16] was very welcome. The practical aspects of DP disaster recovery preparedness rarely have been presented in such detail or in such a reasonable fashion.

Murray's remarks really related only to conventional batch-oriented operation. Threats, risks and optimum recovery procedures are significantly different in any sort of time-critical or on-line environment.

While a natural disaster, a strike or some sort of civil unrest may result in file destruction, disruption in processing continuity tends to be a more significant outcome. The goal in any sort of diaster recovery effort should be the prompt restoration of critical applications processing. In the immediate postdisaster period, it is often highly unlikely that the overall DP activity can be made whole. Recovery efforts should concentrate, then, on restoring those applications that will play a key role in overall organizational survival.

In his article, Murphy appeared to imply (perhaps unintentionally) that there is only a one-time cost involved in the transfer and control of files placed in secure off-site storage. This must be a recurring cost if a reasonable level of disaster recovery capability is to be maintained. That capability quickly diminishes — and can be destroyed — when these files are not kept current.

The off-site storage facility selected, as Murray noted, "must be far enough away from the data center so that a disaster will not endanger the back files." Two additional considerations should be noted. First, that distance varies with the nature of the area in question and the threats to which the data center may be exposed. The ideal distance could be as short as five miles; or, it could be 50 miles — or even more. There is no single distance range that will apply in every instance.

Second, what is important is that the off-site facility — wherever it is located — be capable of responding promptly when an emergency occurs. For instance, an elapsed time of 12 to 35 hours in delivering backup tapes is not a suitable response level when the recovery goal is to resume processing the applications involved in no less than four hours!

Wiser Alternative

A mutual sharing agreement, such as that described by Murray, implies pure reciprocity. That sort of agreement is relatively inexpensive and simple to establish and maintain. The trouble is that it too often works well only in theory and not in practice. Reliance on a well-managed commercial recovery facility or on a formally structured multiparticipant mutual aid arrangement appears to be wiser and not significantly more expensive to maintain.

Murray listed just four underground records storage facilities. There are numerous others that could also be considered. Given the

(Continued on Page 40)

READER COMMENTARY/Frank C. Fillmore Jr.

Cobol Report Writer Pays Big Dividends

After reading with interest *Computerworld's* recent Special Report containing reader panaceas for DP's productivity problems [CW March 30], I was struck by two seemingly unrelated thoughts. First, technical solutions offered were generally complex and/or expensive, requiring a significant shift in a shop's procedures, standards and so forth.

Second, no "people" solution addressed what can be one of the most crippling (and therefore productivity-inhibiting) problems a DP organization can face, one that is overwhelmingly attributed to users: bias and resistance to change within the middle levels of the DP department itself — that is, people performing the function of systems analysts and sometimes their immediate supervisors and subordinates.

By way of an example of my second reaction and a counterexample to my first, I offer the ANS Cobol Report Writer feature.

Report Writer is already available on ANS Cobol compilers, incurring no cost for acquisition or installation. It is fully documented in the selfsame manual that programmers now reference when coding Cobol programs. It eliminates the need for "filler" data items in the Data Division and MOVE statements in the Procedure Division relating solely to printed output.

Report Writer significantly reduces the amount of source code in the Procedure Division necessary for generating documents of all types, including management reports and special forms output. This benefit is especially noteworthy as reduced Procedure Division code greatly facilitates the use of structured methods of coding, debugging and eventual maintenance. By removing the rudimentary work of producing printed output from the Procedure Division, Report Writer highlights a program's logic, enabling programmers to debug and maintain a module without the distraction of repetitious and extraneous code.

In the Data Division, lines-of-code savings are arguable, but Report Writer's columnar formatting reduces initial coding effort and, if coding is done from a printer layout form, virtually eliminates recompiling to adjust headings or the like. Multiple report formats are much more easily distinguishable using Report Writer. Counters or accumulators need not be coded, ergo none need be initialized. Control breaks are handled automatically: no coding "hold" data-names for comparison purposes.

Those are just the routine benefits visited upon Report Writer users. Sophisticated applications make use of Report Writer generated accumulators, transferring them to output file records in a "declaratives" section activated by a use-before-reporting clause. Hence, reports are printed and summary output files are written with nary a manually coded summation routine in sight. I could go on,

(Continued on Page 40)

HUMAN CONNECTION/Jack Stone

Mumps Takes the Heat Off, User Claims

A fast-growing group of programming language aficionados claims that its entry — Mumps (may the heavens soon rescue us from acronyms) — is "the only really human programming interface to a computer system."

Well, I'm not naturally a skeptic, but I couldn't help being at least slightly incredulous at such a statement, so I asked for some clarifying information from Henry Heffernan, chairman of the Mumps Users' Group (Suite 800, 1001 Connecticut Ave. N.W., Washington, D.C. 20036). You can draw your own conclusions about whether you want to look further into the language and its implementation on your system.

His enthusiastic letter reply began with a statement on how the language helps user/computer center relations. "Mumps is unique, perhaps, in that its initial design goals — and these goals have been constantly kept foremost throughout the past decade — put priority on making the DP environment more human. Using Mumps, one does not have to develop human relations strategies to compensate for the interpersonal stresses that normally arise in the relationships between users and DP specialists — and that arise between members of the DP shop. The reason is that the design of the language is such that those stresses are forestalled by removing the problems that give rise to those stresses.

Modifications in Minutes

"For example, program modifications to suit urgent requests from users can be made usually within minutes or within the same day — the language was designed for ease in changing applications code. Therefore, those tensions that can build up when the user is waiting and waiting for the requested change simply do not arise."

He stated his belief about the decaying needs for programmers. "The standard specification of Mumps (ANS X11.1) integrates job control and data management instructions into the high-level language used by the applications programmer. No tensions arise between systems programmers and applications programmers because there are no systems programmers — their job has been automated.

"The Mumps language is easy to learn. There is an intuitive reasonableness to the instruction set that makes it easy to remember and use. Moreover, there are programmer tools built into the standard specification of the language to further simplify use.

"The language is simple enough to learn that many end users currently do their own coding. In addition, the language has capabilities that make it relatively easy for applications programmers to build natural-language query languages and data base management systems for users to make end-user applications development even easier."

Saves the Day

Finally, Heffernan described how many DP managers have tried Mumps and liked it. "DP managers who have acquired Mumps capabilities have usually done so primarily because they have found themselves with their backs to the wall (with respect to a crushing work load) and no solution in sight . . . When they did get out to see what Mumps was accomplishing, they were faced with a reality they could not dismiss. Mumps has saved the day in many crisis situations . . .

"I expect that few DP managers made the decision to acquire Mumps capabilities on the basis of the claims of users that Mumps did result in a more human working environment. Evaluating the truth of these claims is difficult for an outsider because so many factors can account for smooth working relationships, and perceptions of harmony are subjective.

"Nevertheless, other things being equal, after a user DP department has settled down with Mumps, the human character of working relationships does experience a shift for the better. The major irritants and causes of friction have been removed because of the characteristics of the language.

"I don't expect you to be convinced by what I say; I hope you will begin snooping around among Mumps users and make your own judgment. DP does not have to be the ulcer factory it so often is. And the more people understand that there is a different way of doing things — when they use Mumps — the better off everyone will be."

Preparing for Disaster With Off-Site Storage

(Continued from Page 39)

nature of existing temperature/humidity control technology and the efficiency of available process-cooling equipment, it is not essential that magnetic media be maintained in an underground site. An underground site does offer some protection against the direct and consequential effects of a nuclear strike. But it makes no particular contribution to orderly recovery from the effects of, say, a fire or civil disorder. And, in the wake of a flood, an underground site could prove to be a liability.

Murray referred to the precautionary periodic dumping of disk file content to tape. Scheduling sufficient time to dump high-density disk content with any reasonable frequency may not be feasible in some situations. Here the alternative may be redundant operation — writing concurrently on a remotely located duplicate disk or other mass storage device.

However and wherever backup magnetic media are stored, media kept in long-term storage should be "exercised" at least twice a year to assure that the media substance remains viable and to avoid possible content degradation or loss. In some instances it may be advisable to rewrite this type of content routinely to another unit whenever the magnetic media is exercised.

Development and consistent use of a formally approved records retention schedule will assure that, as Murray rightly suggested, there is a periodic review of the disaster recovery process. Such a review, incidentally, is called an audit. These schedules, themselves, are information resource management tools that have been widely used for more than 30 years; incidentally, their use with *all* DP records would improve generally the effectiveness of any data center operation.

Menkus is a DP management consultant based in Middleville, N.J.

Report Writer Pays Big Dividends

(Continued from Page 39)

but you get the point.

Now compare the hosannas I've sung for Report Writer to typical analyst/project leader replies to using it: "It has too much overhead." Sure it does, but so do data base languages and on-line programming tools such as Panvalet, ICCF and CMS. Maybe the former and most assuredly the latter were installed by managers willing to spend machine resources (as well as money) to improve staff productivity.

"No one else on the staff knows it. Who will maintain it when you leave?" This is clearly a Catch-22 response — no one will ever know it unless some programmers take the initiative (with some analyst's assistance). After some noncritical applications are coded using Report Writer, major jobs can be tackled with it and the natural cycle of maintenance and development will soon introduce Report Writer to an entire staff — painlessly.

"It's not standard." This one's my favorite and only further supports my original treatise: a dangerously large number of front-line DP personnel are imbued with the daring and flexibility of the proverbial ostrich. Change or introduction of new techniques will only occur if upper management spends hundreds or thousands of dollars on new software and equipment, chasing a dream that (as this paean to Report Writer demonstrates) may just be found in its own backyard.

Fillmore is a programmer/analyst from Baltimore.

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LETTERS

Code of Ethics

So the Data Processing Management Association (DPMA) is *proposing* a code of ethics for its members [CW, May 4]! The Association of Computer Programmers and Analysts (Acpa) has had a strong code of ethics as a condition of membership since its founding in 1970.

Imitation is the sincerest form of flattery!

James R. Shannahan
Senior Member
Acpa
Santa Clara, Calif.

More Isn't Better

I received this week's issue of *Computerworld* [May 4] and was aghast to note that it has 184 pages! In this day and age of increasing pressures on managerial time, more is *not* better in a weekly technical newspaper. It becomes a real trial to try to stuff this into the briefcase along with all the other reading material.

I believe it is time to consider publishing several papers (each in a special interest area). CW cannot continue to be all things to all people. I also believe it has entirely too much advertising.

Unless something is done along my suggested lines, I am considering not renewing my subscription.

Do other readers have these concerns?

D.L. Campbell, Director
Corporate Computer Center
PPG Industries, Inc.
Pittsburgh, Pa.

Solution Systems

Werner Frank, in his article "Prospects Brightening for DP Productivity" [CW, April 27], used the term "solution system." Since this is a new term, I would like to give my definition, which I believe is the way in which Frank used it.

Functionally, a solution system is a system designed to *solve* the user's information system problems. Therefore, it must be user-friendly at all levels and yet handle complex as well as simple situations.

Technically, a solution system must have these facilities:

- A full-featured data base management system (DBMS).
- A nonprocedural records management system to allow loading, updating and maintenance of the data.
- A nonprocedural reporting system for easy production of reports.
- An executive system for controlling the overall processing.

These facilities must be integrated into a unified solution system. There are several additional features that are useful, but the above are the minimum needed to define a solution system. The executive is especially important, as it allows a solution system to be an application development tool.

There are three users of a solution system: management staff (such as financial analysts), user application developers and professional application developers.

Analysts use solution systems to obtain information from existing data bases. The nonprocedural reporting language, plus the transparent use of the DBMS, facilitates this. Productivity gains of 40 to 1 are common.

Users who take the time to learn a solution system can install simple systems, for example for sales analysis.

Applications developers use solution systems to build complete, complex DP systems for all sorts of uses. Productivity gains of 5 or 10 to 1 are common.

Solution systems are usually operated in an interactive mode. The combination of time-sharing and a solution system brings the computer to the user and provides a response time compatible with the user's thinking time.

Roger L. Sisson
Principal Consultant
Mathematica Products Group
Princeton, N.J.

Bill Misinterpreted

In its Jan. 19 issue, *Computerworld* devoted an editorial to the Information Science and Technology Act (H.R. 8395), which I introduced in the 96th Congress. Although I am grateful that CW was sufficiently appreciative of the importance of information policy issues to devote space to my bill, the editorial misinterpreted the bill on at least one point, and in general it reflected what is at best an incomplete view of information policy development.

I introduced a revised version of the Information Science and Technology Act (H.R. 3137) on April 8. The revised bill is more specific about the role of the proposed Institute for Information Policy and Research and its relationship to existing agencies and programs. In particular, the Office of Policy Analysis and Development of the National Telecommunications and Information Administration (NTIA) is explicitly placed within the institute. (In the

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LETTERS

previous bill, the President was given general authority to transfer information policy research and analysis activities to the institute.)

In neither version was it intended that the institute duplicate existing programs, as the editorial suggested. The new bill is quite specific on this point.

I must also register my disagreement with the editorial's intemperate comments on the motivation and abilities of the NTIA staff. I agree that NTIA's record of accomplishment in information policy has been disappointing, but in my opinion the reason for this is not a lack of competence on the staff's part (even the Reagan transition team gave high marks to the NTIA personnel) but the bureaucratic handicaps of lack of influence within the mammoth Department of Commerce and of having to integrate a policy role with line responsibilities.

The editorial also referred to "dragging in" the private sector and interested institutions, implying a reluctance to become involved. Many such organizations have expressed to us a willingness to participate in policy deliberations and have openly deplored the lack of a forum in which to do so. The attitude implicit in the editorial seems to be that private-sector and educational organizations should be permitted to enter policy deliberations only after a small group in the Executive Office of the President has decided which policy options shall be considered.

A corollary of this view is that a sufficient knowledge base now exists concerning information issues and the developmental trajectory of information technology to allow informed policy choices to be made. I wish this were the case. A number of areas come to mind (the economics of international information flows, for example) in which our knowledge base is still quite inadequate for policy formulation; my statement to the House when I introduced H.R. 3137 (*Congressional Record*, April 8) listed a number of these.

I have no difficulty with the view that the Executive Office of the President has the ultimate responsibility for policy formulation and implementation in the information arena. My concerns are, first, that there is at present nobody to do this; and second, even if there were, providing the knowledge to inform these policy choices will be a continuing challenge in this rapidly evolving field and requires active participation by nongovernmental groups and individuals.

Finally, I was puzzled by the editorial's reference to "an ongoing entity more interested in protecting its own survival than in actually dealing with the problem." Both the original bill and the revised version explicitly contain a "sunset" provision limiting the life of the institute to 10 years, and I specifically noted this fact in my remarks accompanying the bill's introduction.

I too would like to eliminate waste from the federal government and scale down its responsibilities where appropriate. Flaying the bureaucrats may be good sport, but what is really needed is a careful examination and evaluation of our national priorities and of the ability of existing institutional arrangements to deal with them. This will entail reducing or eliminating some programs or agencies, reorganizing others and — yes — evolving new institutions and programs as changed circumstances dictate.

The revolution in information technology may be our most vivid example of where dramatically changed circumstances necessitate new and altered institutions. Ideological judgments about the size and role of government must not be allowed to blind us to the fact that we have other important national interests besides military security.

I thank the editors for this opportunity to express my opinions. The issues we are discussing are complicated, and the best wisdom of all of us will be needed to chart a proper course. I hope our differences concerning tactics will not prevent us from progressing toward our shared goal — the productive and humane use of information and information technology for the benefit of all.

Rep. George E. Brown Jr. (D-Calif.)
Committee on Science and Technology
U.S. House of Representatives
Washington, D.C.

Retirees as Resource

The story on training retirees to fill programming slots [CW, April 20] did a service by pointing out the often-overlooked resource of retired persons. But it might have noted that the full cost for an experienced Cobol programmer, including fringe benefits and office space, is about $150 for each day actually worked. Not only are the retirees paid only $90 per day, but given the normal tendency to underestimate programming time, they will probably net less than that amount.

From the description of the terms of employment, these retirees seem more like independent contractors than employees. I would appreciate an explanation of the difference and a description of the conditions under which it is permissible to pay "employees" on this basis, including any special legal, tax and insurance considerations that might exist in such situations.

Arnold Berger
Legalsystems, Inc.
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LETTERS

Thanks for Time

"School for Handicapped Runs Out of Time" [CW, April 13] gave the erroneous impression that Kaiser Engineers has been less than generous in sharing its computer time with the Center for Independent Living's Computer Training Project (CTP).

I am writing this letter not only to express my gratitude to both Standard Oil and Kaiser Engineers for their donations of computer time, but especially to recognize Kaiser Engineers, whose contribution to CTP has been a key component of this project's success. Since 1978, Kaiser Engineers has donated substantial amounts of computer time. In the 12 months preceding March 1981, the dollar equivalent was $180,000, spread over five virtual machines.

Kaiser Engineers' donation has allowed CTP to provide state-of-the-art training for severely physically disabled persons. As the director of CTP, a project that produces high-quality programmers who help meet the needs of a growing industry, I feel that the gift of computer time should be shared by the corporate community. It is true that the CTP still needs more computer time, especially between 8 a.m. and 5 p.m. Several individual donations of $10,000 to $20,000 of computer time would meet our needs, as well as relieve the burden Kaiser Engineers has so generously assumed.

Sandy Vogen
Director, CTP
Center for Independent Living, Inc.
Berkeley, Calif.

Support for Roscoe

Our apologies to Robert Caughey, product manager of Applied Data Research, Inc. [Letters, CW, April 13]. Triangle Software Co.'s news release, "JCLCheck Now Backs Roscoe" [CW, March 16] was only intended to announce our support of his fine product.

We in no way meant to imply that Roscoe and TSO were comparable in their JCL checking ability. However, in comparison with JCLCheck, Roscoe provides little more than a rudimentary syntax scan of JCL, much as can be found in MVS JES3.

Three points should be underscored:

- If comprehensive JCL validation means syntax checking only, then Roscoe is equally as comprehensive as MVS JES3 TYPRUN=SCAN.
- Roscoe support was added to JCLCheck at the request of several users we have in common. Evidently JCLCheck greatly exceeds the comprehensive checking preferred by Roscoe.
- JCLCheck identifies abend situations and all causes of JCL errors. It generates nine separate reports detailing JCL and produces instantaneous and readable error reports back to the terminal. No such capability exists in Roscoe.

While Roscoe is a superb product, it is now enhanced with the inclusion of JCLCheck support for Roscoe users.

P.L. Dugan
Marketing Director
Triangle Software Co.
Santa Clara, Calif.

Brophy and Travelers

If Joe Brophy and Travelers Insurance Companies could get along without Cobol-74 for nearly seven years, why can't they get along without Cobol-80 for at least as long [CW, March 23]? Since adoption of a standard is completely voluntary, no one will "regulate" them into acceptance.

And why does a man with 1,250 research and development specialists, technical analysts and programmers working for him care whether IBM "supports" one Cobol standard or another?

Can't one of those 1,250 poke into the operating system and dissect out the Cobol connectives, allowing Brophy to keep any Cobol compiler going that he prefers?

Finally, why does Iscor, the giant steel company in Johannesburg, find it possible to convert 11,000 Cobol programs from Control Data Corp. to Burroughs Corp. equipment — far harder than upgrading a language standard on unchanging IBM 3033s — for a lot less than $1 million?

The Iscor shop is about a quarter the size of Travelers and has a much more varied suite of programs than an insurance company. Could it be, ah, competence?

We had lots of Brophys when I worked at the Bureau of Standards. They were too stingy to field a standards man, or even to push their trade association into supporting one.

They let the manufacturers eat 'em up and didn't even try to help Uncle Sam or the professional societies fight back.

I can't call them poor losers, because they never were in the game. How about "soreheads"?

Herb Grosch
Rijswijk, Netherlands

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It's a Creative Process

Formula for Development Success Exists

By Arnie Wernick
Special to CW

What makes a successful software director? Why is it that year after year, some groups produce innovative, useful and marketable products — and others keep missing the mark?

There is a formula to be followed for success in software development. However, it can only be used by those who do not require fixed, highly structured or automatic management methods.

The ability to match the appropriate programmer, engineer or technician to the project is one of the most critical formula components. This element is described by the axiom of "the fallacy of interchangeability" or, more specifically, "engineering man-hours are never equal."

The most obvious implication of this axiom is that creative software design efforts cannot be effectively measured in terms of man-hours. Another is that the director must exercise a certain discernment in order to achieve the requisite match between developer and project — a faculty based on perception rather than mechanical methods.

Software development is a creative process, according to Wernick, and the manager who handles creative technicians as if they are working for production in a manufacturing environment is headed for certain failure. Wernick explains why as he describes some of the factors that affect the development cycle.

Consider the factors that motivate a creative designer. They include the degree of challenge and learning he can obtain from the project, the sheer joy of exercising creative faculties, personal satisfaction when the project is completed, appreciation from others and monetary rewards.

Each person is motivated by these factors in different proportions and it is the software director's job to create a balanced environment in which these factors can operate most efficiently.

Many creative people, for example, will select tasks that are challenging and interesting even if other jobs yield more money. This does not mean they should be paid as little as possible.

Money is a tangible form of recognition even if it cannot replace sincere appreciation based on the real understand-

(Continued on Page 54)

Some Alternatives

If a successful software director cannot use conventional management methods, what are his alternatives? Here are some suggestions from Arnie Wernick:

- Avoid involving the staff in political concerns. The manager should fight those battles so technicians can do their work.
- Make certain there is a backlog of challenging, meaningful work for each person on the staff. Creative people do not like to hear "Sit tight while I think something up." This implies apathy and lack of respect.
- Do not allow the establishment of a hierarchy. Everyone should feel free to consult all other staff members.
- Be confident about any project before it is assigned. Lack of confidence on the manager's part will demotivate the staff.

(Continued on Page 54)

Vsam Aid Cuts Programming Time

BOSTON — A software package for users of IBM's Vsam data access method that is said to reduce programming time up to 20% and reduce the programmer learning curve from weeks to an hour has been announced by Corodale, Inc.

Vsamio, developed by Plus-Soft GmbH of West Germany, also features automatic standard error handling and extended Vsam capabilities not readily available to Cobol programs, according to the developer.

The programmer issues CALLs to Vsamio to request Vsam functions. Vsamio then directly interfaces with the standard, unmodified IBM Vsam to have those functions performed, a company spokesman explained.

The package, which its vendor said is installable in five minutes, is available for all IBM VS operating systems.

The introductory price is a one-time charge of $1,950; monthly plans begin at $99.

Corodale is located at 211 Congress St., Boston, Mass. 02110.

Productivity Aid Runs on System/34

ALTAMONTE SPRINGS, Fla. — Westmoreland Systems, Inc. has introduced a Programmers' Utilities package for the IBM System/34 that it claimed will increase programmer productivity.

The package includes a program that displays and updates the local data area and external user switches; a file copy procedure, which facilitates copying from one file to another or to the printer with optional key select; a program that will generate multiple lines for a screen format from one given line; a menu builder that facilitates menu building with up to three headings, 24 commands and three trailing comment lines; and a menu of IBM procedures that are most frequently used by programmers.

Documentation Tools

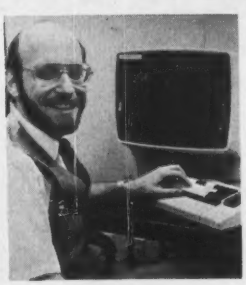
Documentation tools in the package include a procedure exploder, which lists OCL and all nested procedures; a menu documenter that explodes the procedures for each command of a given menu; and a screen format printer, which prints a hard-copy replica of a given screen format.

Programs include a message sending facility, a file size procedure that displays the number of records allocated and used by a file, a VTOC check program that lists sequential and indexed files by percent full and a procedure to make displaying spool entries on the CRT easier.

The Programmers' Utilities package costs $500 from Westmoreland, 105 Pine Needle Lane, Altamonte Springs, Fla. 32701.

Attention: IBM DOS/VS/E Users

DOSSIER IMPROVES DOCUMENTATION AND STANDARDS



Here's what Richard Amster, Systems Programmer, Precision Castparts Corp., says about DOSSIER:

"It's just a tremendous tool. We use DOSSIER on our IBM 4341 to tell us all we need to know about file and program usage. Our programmers and analysts use DOSSIER constantly, day in and day out.

"I don't think there's a product to compare with DOSSIER. The Called Program Analysis facility reads the object code in a program to find out whether another program uses it, rather than just looking at names. And this is really a very sophisticated thing to do.

"DOSSIER's given us a degree of control over documentation and standards we couldn't have achieved without many months of work.

"Frankly, I don't think we're using half of DOSSIER's capabilities, simply because we haven't had time yet. But I'm sure we will in the future. In fact, we're just starting to implement the DOSSIER Library Audit, which looks like it's worth the package price alone."

Richard Amster is not alone in his enthusiasm for DOSSIER. More than 650 customers currently use DOSSIER to clean up, maintain, and audit DOS, DOS/VS and DOS/VSE libraries. DOSSIER is also invaluable for conversions.

Try DOSSIER free, without obligation, for 30 days. For more information, just clip this coupon and mail to Computer Concepts, Inc., 6443 S.W. Beaverton Highway, Portland, Oregon 97221. Or call 503/297-4741.

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☐ More information about DOSSIER.
☐ A 30-day Free Trial.

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'IJR' Processes Journal Tapes On IDMS-CV

WESTWOOD, Mass. — Cullinane Database Systems, Inc. has announced the release of its IDMS Journal Reporter (IJR), a utility said to enable the data base administrator to tune IDMS-Central Version (CV) options and optimize performance.

The IJR processes archive journal tapes prepared by IDMS-CV to analyze and report on system and program activity in the IDMS environment.

It can produce up to eight detail, summary and cross-reference reports showing program and data base resource usage.

Reports include Program Termination Statistics, Program I/O Statistics, Program Summary, Formatted Record Dump, Run Unit Summary and Detail Area/Run Unit Cross Reference.

IJR is free to IDMS/Culprit users. Culprit, Cullinane's report generator package, costs $22,000 from the firm at 400 Blue Hill Drive, Westwood, Mass. 02090.

Office System Adds Efficiency

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. announced an office management system designed to increase efficiency and productivity in the office environment.

The Micos package operates on any of the company's minicomputers starting with one terminal and 10M bytes of disk storage and includes electronic mailing list, filing, mail distribution, calendar/scheduler and call reporting, the company said.

Micos is available at a one-time lease fee of $2,500.

Mini-Computer Systems, Inc. is located at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

'Cids' Designed For Wholesalers

GREENVILLE, S.C. — An order entry and inventory control system designed for wholesale distributors, internal school systems and bank supply departments using the Nixdorf Computer Corp. 600 series minicomputer has been announced by North American Computer Systems.

The Computerized Inventory Distribution System (Cids), an on-line interactive package written in Editor II, also offers purchasing, accounts receivable and sales analysis as optional modules, according to a company spokesman.

Cids is priced at $15,500 in the basic package. North American Computer Systems can be reached through P.O. Box 16446, Greenville, S.C. 29606.

HP Begins Hospital Series With 3000-Based System

PALO ALTO, Calif. — The first in a series of administrative systems for health care applications has been announced by Hewlett-Packard Co.

Hospital Accounting System 3000 (HAS3000), designed to operate on the HP 3000 computer, will be installed and implemented by HP in hospitals, including all the hardware, software and ongoing support necessary to run the four applications: General Ledger, Accounts Payable, Patient Accounting, and Purchasing and Inventory Control.

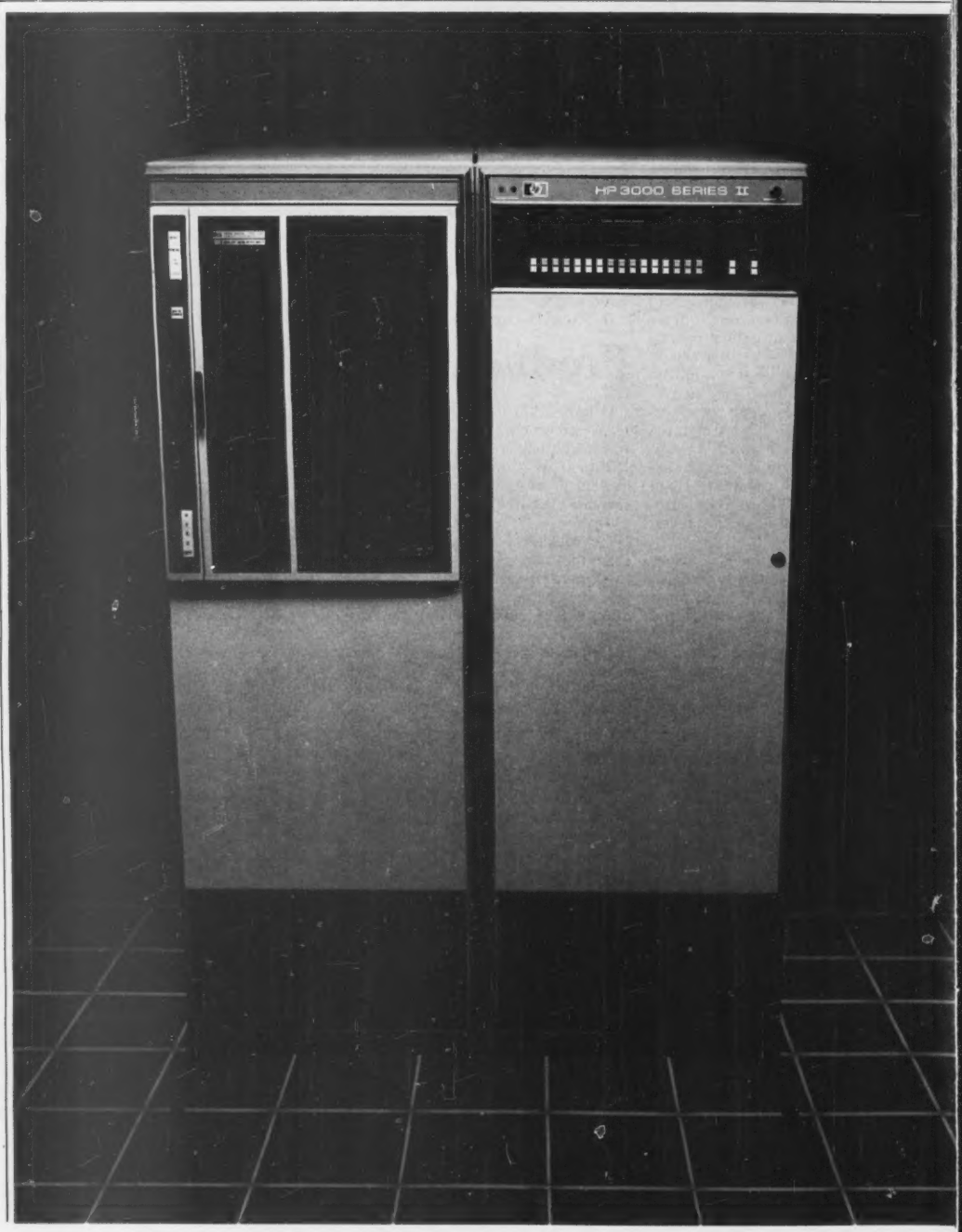
Within the HP 3000 series of computers, each generation uses the Multiprogramming Executive (MPE) operating system so that present software will be compatible with future equipment.

Cooperative Effort

The software was developed as a cooperative effort between Systemhouse Ltd., a Canadian software development firm and HP's Waltham Division in Waltham, Mass.

Base price for HAS3000 software is $85,000. Cost for hardware and service will vary depending on the size of the installation, with the average 300-bed facility costing about $200,000.

The system is available from HP, headquartered at 1501 Page Mill Road, Palo Alto, Calif. 94304.



'System 2000/80' Fits Univac CPUs

AUSTIN, Texas — Intel Corp. has announced the availability of its System 2000/80 data base management system (DBMS) for the Sperry Univac 1100/60 series of mainframes.

System 2000/80 DBMS is said to complement the 1100/60 machine in two primary ways: its data storage, data manipulation and information retrieval capabilities handle the needs of medium to large organizations, and its end-user orientation obviates the need for programmer support.

Additional features such as Quest, Report Writer, Multi-User/Multi-Thread and Programming Language Extension (Plex) are said to augment the basic 2000/80.

The basic system, including Intel's Basic Data Dictionary, Queue access, a data base manager and Plex, costs $45,000, with maintenance $4,500/year after the first year.

As for options, Quest costs $15,000, Report Writer, $10,000 and Multi-User/Multi-Thread, $20,000. Additional Plex packages, in Cobol or Fortran, cost $10,000.

For other Univac 1100 series and for Control Data Corp. 6000 and Cyber 70/170 and IBM 360/50, 370/135 and 4300 series mainframes, basic packages range from $49,000 to $60,000.

Intel is located at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

'Model 204' DBMS Gains Screen Formats for 3270

CAMBRIDGE, Mass. — Computer Corp. of America has introduced a new release of its Model 204 data base management system that reportedly allows the user to retrieve on any field, key or nonkey, allowing field definitions to be changed and existing programs to execute without modification.

In Release 6.0, User Language was extended to provide screen formatting services for IBM 3270 CRT terminals. It now includes features such as menu definition and selection, data entry and automatic data validation.

Model 204 is available for all systems capable of running IBM's OS and OS/VS operating systems. It costs an average of $150,000, depending on configuration.

Computer Corp. of America is located on the Eighth Floor, 675 Massachusetts Ave., Cambridge, Mass. 02139.

VAX, PDP Get Conversion Aid

PENNINGTON, N.J. — A utility for Digital Equipment Corp. PDP-11 and VAX-11/780 assembly language conversion said to produce VAX-11/780 assembler source code in less time and with fewer errors than manual conversion is available from Pennington Systems, Inc.

In the conversion process, Conpax uses addressing modes and other information from the PDP-11 assembler code to produce the VAX-11/780 conversion for each line, including multiline alternatives when appropriate, the vendor said.

The utility also automatically handles details like supplying octal radix indicators, translating Ascii literals to VAX-11/780 format and substituting standard VAX-11/780 register names, the vendor claimed.

Conpax carries a one-time license fee of $5,000 per site from Pennington Systems, Inc., 65 S. Main St., Pennington, N.J. 08534.

Basic Offered In VT100 Kit

SUNNYVALE, Calif. — The Micronode Basic language, furnished as part of the Digital Equipment Corp. VT100 conversion kits from Data Node, Inc., features dual access modes to files on a PDP-11 host computer.

Using the CP/M diskette emulation feature, the VT100 microcomputer programmer may access the host computer as if it were an attached diskette drive, according to the firm.

Host data managed files are said to allow the programmer to directly open and access the host's data managed files using such Isam calls as LOCATE, READ ONLY NEXT RECORD and PREVIOUS RECORD.

Micronode Basic comes with the firm's 64K-byte Z80A microcomputer board that changes DEC VT100s to microcomputers. The package costs $1,850. The Micronode Basic Reference Card is available free from the vendor at 432 Toyama Drive, Sunnyvale, Calif. 94086.

UP YOURS.

WHAT'S UP?

UP is United Peripherals. And United Peripherals is a company that specializes in putting together the industry's finest disk subsystems with some of the industry's finest minicomputers. If you're an HP 3000 user looking to up your capacity in less space, to up your cost efficiency with fewer hassles and to up your uptime with fewer spindles, UP is your next logical step.

HP MAKES TERRIFIC COMPUTERS, BUT...

Let's face it, their disk drives have not been trendsetters. Just look at the record. In 1974, when HP was introducing its 3000 computer, a firm named IBM was announcing a drive technology they called Winchester. To this day, that technology has stood as the standard in drive design, performance and reliability. And to this day, HP has yet to offer to its 3000 users a Winchester drive. And since they introduce new drives about every two years, it is not for lack of opportunities.

A PREMATURE ANNOUNCEMENT OF HP'S LATEST DINOSAUR.

Recently, HP has been telling its 3000 users to hang on, to wait just a little longer for its new 400-mb drive. Rumored for introduction this year, when it does arrive, this one won't feature Winchester technology either. Well, maybe next time. And if you are wondering what HP intends to do with the drives the new one obsoletes, you're not alone. Or maybe you are.

MOVE UP. A SMART MOVE FOR NOW. AND FOR THE FUTURE.

Put aside HP's underwhelming strides in disk drive technology, their less-than-spectacular history of drive model longevity, the question marks of when their new 400-mb model will be here and what will happen to the once-again obsoleted ones that the new model is meant to replace. Consider instead the UP1696 disk drive subsystem. Defined by CDC's 600-mb Model 9775 with state-of-the-art Winchester design, and Microcomputer System's 1696 controller, the UP1696 is a better product in every way. Compared with what HP says is coming, the 1696 delivers more capacity and is based on a superior technology. Compared with HP's current 7925, the UP1696 delivers four times the capacity—and more uptime—in the same space, with dollars-per-megabyte savings of up to 40% and floor space savings of up to 75%.

A DEAL TO APPRECIATE. AND DEPRECIATE, TOO.

Here's the deal. We'll put a UP1696 subsystem on your floor and buy back up to three of the four 7925s it effectively replaces. And for each UP1696 add-on purchased, we'll buy back two more 7925s. Such generosity has its limits, so order soon. Besides, the sooner you see the UP1696 in action, the sooner you'll appreciate its performance. And, as far as Uncle Sam is concerned, the sooner you'll start depreciating it as well.

CALL UP.

So, if you own an HP 3000 or are contemplating one, we'd like to give you more information on how and why to UP yours.

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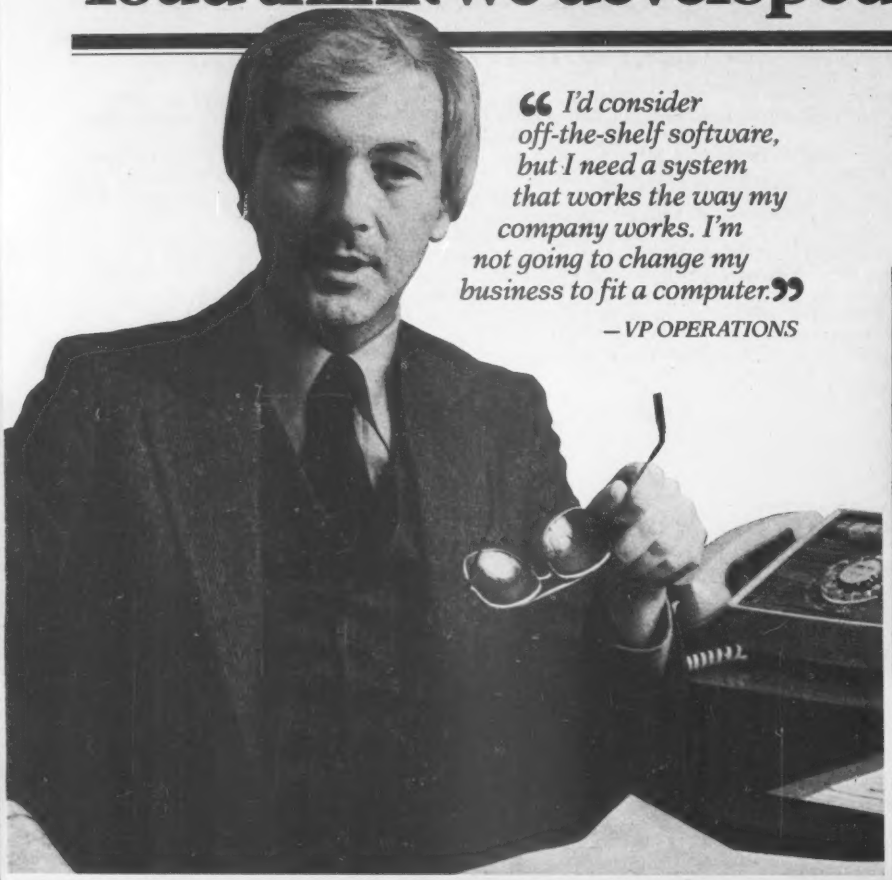
You'd think we developed our materials

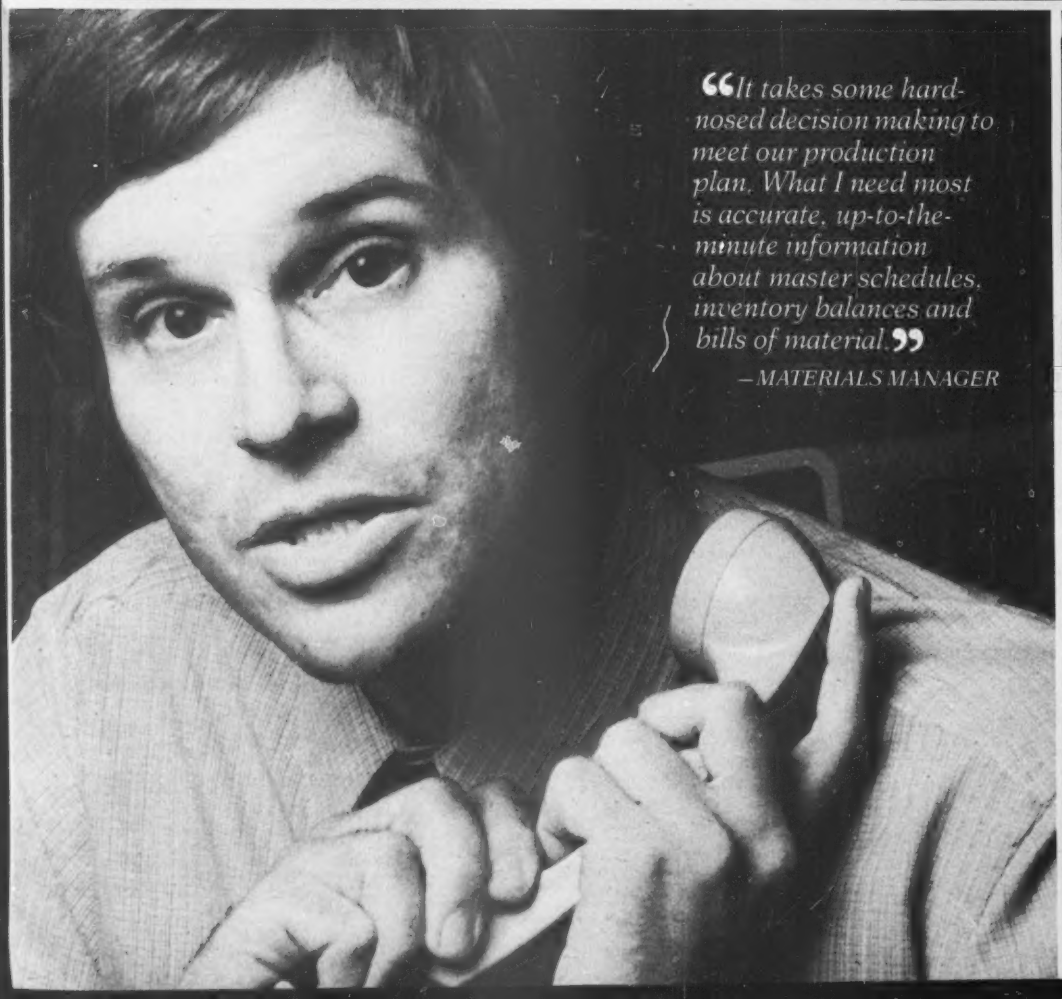


"I'd consider off-the-shelf software, but I need a system that works the way my company works. I'm not going to change my business to fit a computer."

—VP OPERATIONS

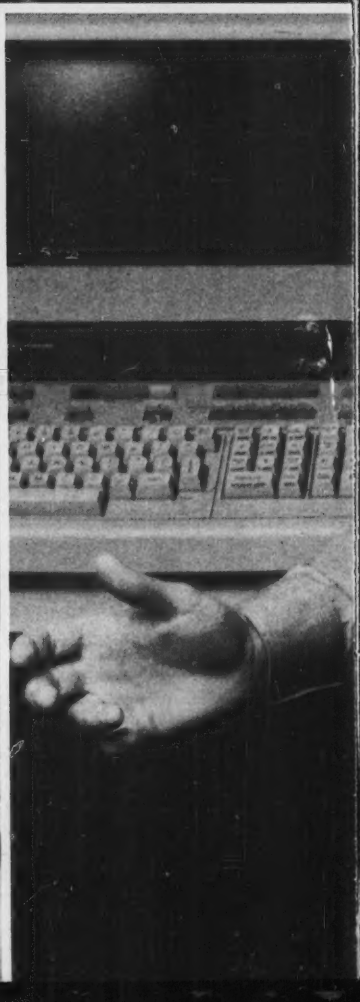
"All I can say is that the system better be easy to use. Here in the stockroom, we don't have time to become computer experts."

—STOCKROOM MANAGER



"It takes some hard-nosed decision making to meet our production plan. What I need most is accurate, up-to-the-minute information about master schedules, inventory balances and bills of material."

—MATERIALS MANAGER



management system just for you.

At last there's a new approach to application software for manufacturing—a materials management system that you can tailor to fit your company's needs. Without programming. And with continued support from Hewlett-Packard.

We call it Materials Management/3000.

Designed to run on our powerful HP3000 computer, Materials Management/3000 gives you the information you need to help reduce your inventory investment and still meet your delivery schedules.

Customize as you go.

Materials Management/3000 comes ready to run. So you won't have the headaches of a long, costly implementation process. But it's also easy to customize to fit more closely the way *you* work.

With a simple "fill-in-the-blanks" approach, your staff can define the kinds of information you'll need and determine the best ways to present it; set up data entry forms like the ones your people are used to using; establish security levels; and change any of these at any time to keep up with the growth of your business.

What's more, Materials Management/3000 is on-line and interactive, so your information is always accurate and up-to-the-minute. And it's available with just a few simple keystrokes whenever you need it.

The building blocks for building products.

Ten separate modules work together to give you a firm handle on your materials plan. You can monitor purchase and work orders, as well as materials issues and receipts. The Master Production Scheduling module lets you simulate new plans before implementing them. Rough Cut Resource Planning helps you spot critical resource problems early. And the MRP module pulls it all together to generate the plan for ordering all parts and material.

A partner in productivity.

HP manufacturing specialists will work with you right from the start to help you plan your Materials Management/3000 system. And even after you've customized it, they can continue to give you full support and service, as well as the latest software enhancements.

If you'd like to see Materials Management/3000 in action, just contact your local HP sales office listed in the White Pages. Or write for more information to Hewlett-Packard, Attn: Rich Zalisk, Dept. 374, 11000 Wolfe Road, Cupertino CA 95014.

HEWLETT PACKARD

"Developing your own in-house materials system is one alternative, but it's an extremely lengthy, and costly, proposition. I need a system now, and one that won't tie up my programming staff."

—EDP MANAGER

47001HPG55

GE Net Users Get Tool For Business Reports

NEW YORK — A software tool said to enable unsophisticated computer users to generate comprehensive business planning reports is being offered by Coopers & Lybrand.

Available through the General Electric Co. time-sharing network, Bizplan allows users to produce analyses and projections, incorporate certain simplified assumptions and select commonly used procedures for business planning.

Bizplan is preprogrammed to produce planning reports helpful in preparing start-up studies and projecting capital needs.

An average run on the network costs $30 to $35, a spokesman said from 1251 Ave. of the Americas, New York, N.Y. 10020.

'Pure' Written for CS

EAST BRUNSWICK, N.J. — A software package for water and sewerage authorities written for the Data General Corp. CS line of computers and said to use English language queries has been announced by Computer Technicians, Inc.

The Public Utilities Reporting (Pure) system provides for data entry, account maintenance, meter transactions, billing, late notices and report generation, all written in DG's interactive Cobol under ICOS, the vendor said.

Available May 1, the Pure packages are priced at $2,500 for each of the water and sewerage units from Computer Technicians, Inc., Plaza Hill Building, 646 Rt. 18, E. Brunswick, N.J. 08816.

Prime Users Offered Control Aid

ENGLEWOOD, Colo. — A software package designed as a resource control system for Prime Computer, Inc. computers and reportedly featuring user-tailored menus for improved application environment control had been announced by Progression, Inc.

Menu provides full-screen add-change-delete utilities for admininstrator control of individual user profiles and includes a "help" subsystem that provides on-line documentation for all menu functions, a Progression spokesman said.

The package requires an operating system revision of 17 or higher, a 9-track, 1,600 bit/in. magnetic tape drive, a disk area of at least 24M bytes and a CRT terminal with clear screen and cursor control capabilities, the vendor said.

Menu is priced at $5,000 from Progression, Inc., 3375 S. Bannock St., Englewood, Colo. 80110.

'Scribe' Boasts Text Marking

PITTSBURGH — Unilogic, Ltd., has announced a new version of its text formatting and document production system for the Digital Equipment Corp. Gigi color graphics terminal.

Scribe now allows the writer to create complex documents by marking pieces of text rather than formatting commands, while preparing a manuscript file using an ordinary text editor, the vendor claimed.

The system requires 1.5M bytes of disk storage for its data base and is supplied in executable binary form relying on no software other than the operating system.

Scribe carries a one-time perpetual license fee of $25,000 and is available from Unilogic, Ltd., 605 Devonshire St., Pittsburgh, Pa. 15213.

"I (for once) was speechless."

– Dave Mallery, March, 1981 issue of RSTS PROFESSIONAL

To tell the truth, so are we. We knew DISKIT would amaze RSTS users, but, frankly, we were unprepared for the response. Phone calls, letters, and now the RSTS PROFESSIONAL – all saying what we want you to know:

DISKIT is a remarkable software tool!

Listen to what else Dave has to say:

"...using DISKIT, I created 130 accounts and fully extended their centered UFDs in 3 minutes and 40 seconds (a job that used to take 4 to 8 hours.)"

"I then copied the full contents of a 300 MB RM05 equivalent to this new 'well-structured' disk in 45 minutes, optimizing clustersize and contiguity in the process..."

DISKIT IS A DISK STRUCTURING UTILITY

As Dave discovered, DISKIT's disk structuring utility, DSU, is fast. It also:

- Optimizes file clustersizes
- Places and pre-extends UFDs
- Performs transfers between unlike disks
- Saves all accounting data
- Allows manual file placement
- Provides full logging and statistics
- Includes sophisticated error handling and recovery

DISKIT IS A DIRECTORY PROGRAM

But DISKIT is more than a disk structuring utility. DISKIT's Macro-11 directory program, DIR, displays directories 12 times faster than before – looking up files by name, extension, and date (with wildcards) at the incredible rate of 250 files/second.

And DIR is smart. It supports all standard DIRECT switches (including backwards, up to 1,000 files) with features you won't find elsewhere - like password lookup, UFD placement, and UFD size.

DIR even works as a diagnostic tool on dismounted disks, detecting bad directory structures and identifying them with comprehensive error messages.

DISKIT IS AN OPEN FILES DISPLAY PROGRAM

DISKIT's Macro-11 OPEN program displays open files by job – with complete job and file statistics. It even has a "sleep switch", allowing you to dynamically update information at any desired interval.

DISKIT LETS YOU WRITE YOUR OWN DISK HANDLING ROUTINES

Best of all, the very same routines used in DISKIT are included, with documentation, so you can write your own disk handling routines. In minutes.

DISKIT IS THE FIRST SOFTWARE TOOL KIT FOR COMPLETE DISK MANAGEMENT

The DISKIT package provides all the tools and utilities you need to create and manage a well-structured disk. The entire DISKIT package, with extensive documentation is available now for only $1250.

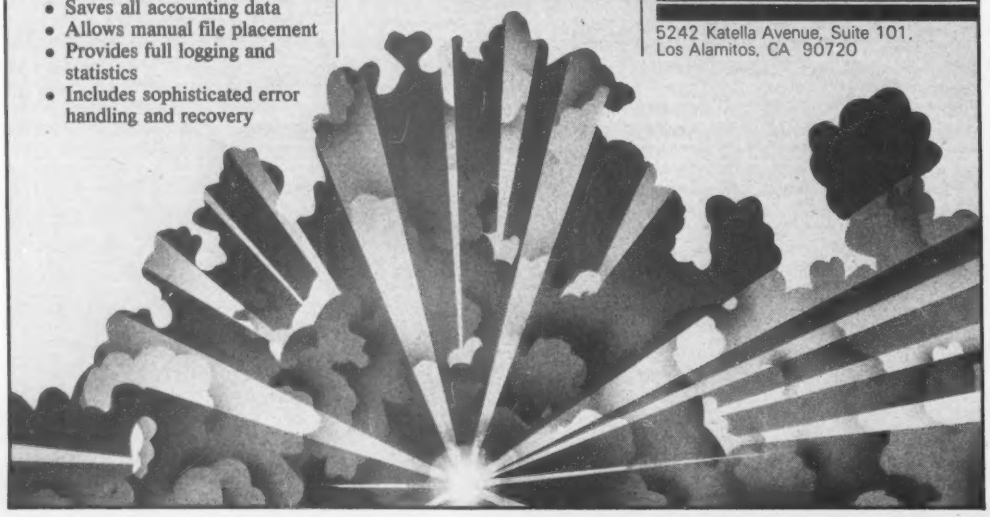
DISKIT, Dave says, "...is the 'final solution' to structured disks, eliminating all of the time and complexity and reducing the job to one of a SAVRES."

What more could we say?

Once again, we've got the answer.

Software Techniques, Inc.

5242 Katella Avenue, Suite 101.
Los Alamitos, CA 90720



All U.S. Sales/Use Tax Rates on magnetic tape...

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222 Lancaster Ave., Devon, PA 19333
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Package Gives Benefits Individually

MONTVALE, N.J. — A software package said to produce individual statements of employee medical, disability, survivor and retirement benefits is available from Information Science, Inc.

The Benefits Statement features two add-on modules for calculating social security and generating variable text. It will operate on the company's HRS II personnel system or can be interfaced with the user's own personnel or payroll system or operate as a stand-alone, the vendor claimed.

The package also runs on IBM 360, 370, 30 series and 4300 systems with a minimum of two tape drives and one disk, the vendor said.

The basic Benefits Statement package is priced at $13,440, with options available. Information Science, Inc. is at 95 Chestnut Ridge Road, Montvale, N.J. 07645.

'DMS-80' Upgraded

MONTGOMERYVILLE, Pa. — A-O Komputing, Inc. here announced an upgraded release of its Direct Mail System (DMS-80), which it said provides for the organization and maintenance of mail lists, as well as adding selection capabilities for label processing.

DMS-80 can handle an unlimited number of mail lists with names and addresses stored only once, according to the vendor. Names can be listed alphabetically or by Zip Code.

Labels are coded for machine Zip Code sorting and printed in optimal sequence to take advantage of postal savings, A-O Komputing said.

Also available is an analysis of mailing performance which reports the percentage of responses by group.

A permanent license for DMS-80 is available for $5,000 from A-O Komputing, Inc., Technology Center, 1060 Rt. 309, Montgomeryville, Pa. 18936.

Directory Lists Data Bases

SANTA MONICA, Calif. — The spring edition of *The Directory of On-Line Databases* features 135 companies and 769 on-line data bases worldwide. It is published by Cuadra Associates.

A one-year subscription costs $60, Cuadra said from Suite 12, 1523 Sixth St., Santa Monica, Calif. 90401.

'UCC Ten' Dictionary, 'Pips' Updated

DALLAS — University Computing Co. (UCC) has announced Release 3.2 of its UCC Ten Data Dictionary/Manager and Version 3.0 of its Paperless Item Processing System (Pips).

Release 3.2's Application Development Facility (ADF) support includes an interface for all static rules as well as Message Format Service screens and all transaction drivers, according to the vendor.

Generation of rules for ADF system, segment, field and generate statements can be accomplished directly from the UCC Ten Data Dictionary definitions, the vendor said.

HELP Screens

The release provides CICS users with Basic Mapping Service screens and HELP screens for all UCC Ten functions, as well as automatic screen switching. IMS/VS 1.1.6 support is included in Release 3.2 with complete IBM 6670 hardware support and Message Format Service extensions, the vendor said.

Featured in Version 3.0 of Pips is the Depository Transfer Check (DTC) module that provides for cash concentration of debits to be distributed through the Pips transit facility.

DTC capabilities include accepting industry standard or Nacha tape format from a balance reporting company, reformatting the tape to Nacha standards and providing identification code.

UCC Ten costs $24,000 with lease terms available. Version 3.0 of Pips costs $16,000 from the firm at UCC Tower, Exchange Park, Dallas, Texas 75235.

3274 & 3276 USERS:
RAYTHEON SAVES.
ONLY RAYTHEON SAVES YOU UP TO 30%, WITH THE SPECIFIC TERMS YOU NEED NOW.

No one can match Raytheon's price advantage in the IBM 3274/3276-compatible terminal market. 30 per cent below IBM. Up to 20 per cent less than other suppliers. But Raytheon gives you even more. We tailor lease or purchase programs to your specific needs, with one-to-five-year terms, purchase options, early termination provisions, and other programs unmatched in the industry. With Raytheon's PTS-2000 alternative, you get more than savings. You get a product rich in expansion and performance features, delivered in 30 days. From Raytheon Data Systems, a division of the $5-billion Raytheon Company. And a worldwide leader in terminals, distributed processing, and word processing by Lexitron.

Find out about Raytheon's PTS-2000, the 3274/3276-compatible terminal alternative. Call 800-343-6676 or send us the coupon today.

RAYTHEON

RAYTHEON DATA SYSTEMS
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THAT'S WHY RAYTHEON IS #1*

Tell me more about the PTS-2000.
Name Title Company Street City State Zip Telephone

*Among independent 3270-compatible equipment suppliers, according to International Data Corporation.

Space Station.

NASA shuttles information with TI's 810.

NASA required a printer that was both fast and reliable to handle the heavy workload in their Logistics Management System for inventory control. And they made a wise choice when they selected TI's OMNI 800* Model 810 Receive-Only Printer. For over two years the field-proven 810 has been working virtually nonstop as an inventory tracking station, printing out information at a speedy 150 characters per second.

The 810 RO prints out the status and location of over 470,000 parts and supplies for all *Columbia* and *Columbia* ground-support components for NASA's space shuttle program. Using TI's 150-million character-life impact printhead, the 810 RO also prints transaction reports, local stock movements, purchase requests, forecast requirements and approved parts lists.

And the 810 RO is proving itself in NASA's simulator capsule used for designing the space shuttle. The 810 RO prints out data on the simulator's specification, design and testing results. It gives NASA scientists and engineers the fast, easy-to-read information they need to design and refine the space shuttle interior.

The 810 RO has also had quite an impact on NASA's accounting operations. Its wide, adjustable carriage easily handles a variety of multi-copy forms for accounting, travel authorizations, balances and fund source reports.

Versatile, reliable and speedy, the 810 is providing results for other industries outside aeronautics. Airline, newspaper and real estate industries are using the 810 RO Printer in projects of their own where quick, dependable printing is required.

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If you would like more information on the OMNI 800 Model 810 Receive-Only Printer, contact the TI sales office nearest you, or write Texas Instruments Incorporated, P.O. Box 202145, Dallas, Texas 75220, or phone (713) 373-1050.

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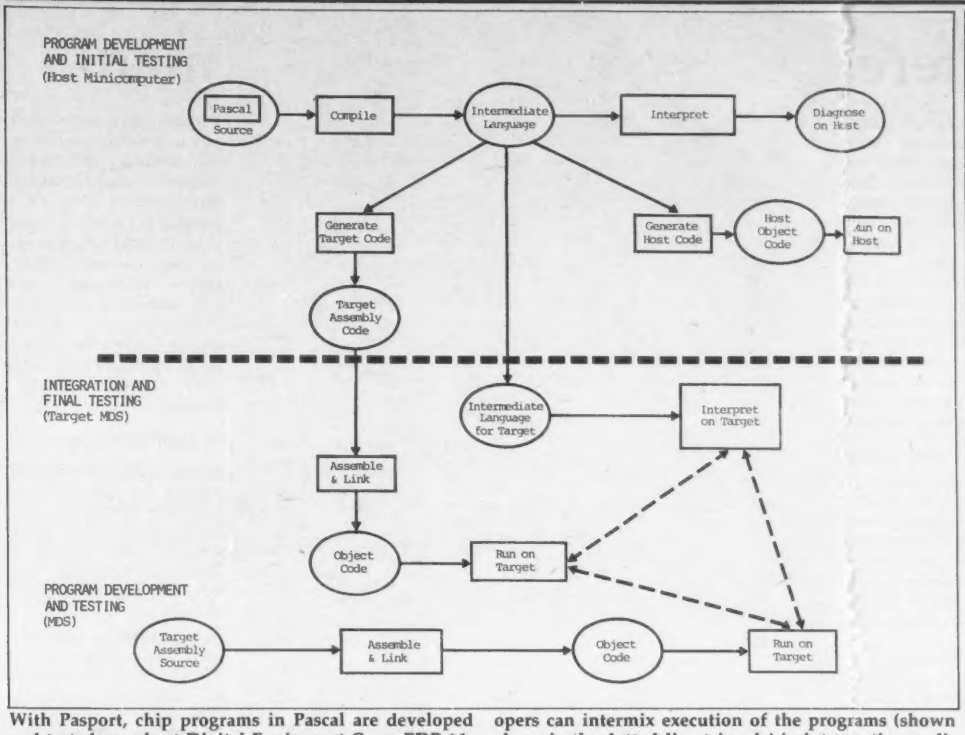

With Pasport, chip programs in Pascal are developed and tested on a host Digital Equipment Corp. PDP-11. Then they are compiled into an intermediate language for runtime checking and program debugging. Developers can intermix execution of the programs (shown above in the dotted-line triangle) in interpretive or direct modes on the microprocessor development system. Typical compilations run at 2,000- to 3,000 line/min.

PDP-11s Get Pascal-Based System

By Brad Schultz
CW Staff

CAMBRIDGE, Mass. — A Pascal-based software system for Digital Equipment Corp. PDP-11 minicomputers is available to pretest programs written for 16-bit microprocessors.

The Pasport system from Intermetrics, Inc. is intended to meet heavy demand among organizations that write microprocessor programs for ways to cut development time, which is normally much longer for the new 16-bit microprocessor models than the 8-bit chips. The emerging class of 16-bit chips will have limited value until cost-effective methods of programming them become widely available, an Intermetrics spokesman told the press last week.

Pasport is a cross-compiler system that runs on PDP-11s under Bell Laboratories, Inc.'s Unix or DEC's RSX-11M operating systems. The initial version, scheduled for deliveries beginning next month, aids development of software for Intel Corp.'s 8086, a popular 16-bit chip.

Other Pasport versions may appear in a year for the Motorola, Inc. 68000 and Zilog, Inc. Z8000 16-bit chips. Intermetrics' strategy is to have its cross-compiler support whatever microprocessors prove popular in the fast-changing 16-bit marketplace. The company also may allow Pasport to run on DEC's VAX computer systems.

MDS Projects

Normally, users and vendors must acquire a number of microprocessor development systems (MDS) and highly skilled software experts to undertake a major development project, the spokesman pointed out. MDS typically cost $25,000 each while the necessary experts demand premium salaries.

Such projects generally become more difficult to plan, and more expensive and complicated to undertake, as more applications of microprocessor software are conceived. The new 16-bit chips can allow more complex and diverse applications, the spokesman noted, but software tools like Pasport will be needed to keep the number of required MDS and programmers affordable.

Shared DEC

Pasport permits several programmers to work together on a shared DEC system in developing chip software, using the system's file management, source control and archival features, as well as large storage disks, high-speed printers and other peripherals.

The cross-compiler meets the International Standards Organization's 1980 standard for Pascal, which is a high-level language commonly taught to computer science students and becoming popular in commercial DP.

With Pasport and an MDS, the programmer would enter the prospective routine into the DEC system and have it compiled.

The system could then call any syntactical or logical errors to the programmer's attention, or load the routine into the chip and verify that it can run there correctly. Chip programs can comprise hundreds of thousands of code lines, so debugging time is reduced significantly when Pasport harnesses the computational power of a DEC minicomputer, the spokesman said.

Pasport costs $15,000. It is the first major commercial product of Intermetrics, a company that has served the federal government, aerospace and high-technology industries for 12 years. Intermetrics' headquarters is at 733 Concord Ave., Cambridge, Mass. 02138.

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Formula Offered for Software Development

(Continued from Page 45)

ing of the finished product. In cases where management lacks this understanding, dollars — something that management does understand — may, in fact, be a very sincere form of appreciation.

The astute systems director will consider all of these factors and work to provide an environment in which the designers may freely exercise their creativity. This leads to a second axiom: "Efficiency in creative tasks is inversely proportional to the cube of management efforts." In other words, only "necessary" management is justified — everything else is simply a justification of management. These are rather strong statements and the conventional manager is apt to question their underlying reasoning.

Conventional management techniques are based on modeling and enterprise, monitoring externally visible variables and manipulating these variables to a known result.

This approach is quite reasonable for a production environment where the goal is to produce a well-oiled machine in which the raw materials enter at one end, the crank is turned, and the finished product emerges.

Different Approach

Someone who requires structure, control, safety and, perhaps, power may function quite well in that environment. But that person cannot directly sustain a creative atmosphere. Creative endeavors require a vastly different approach that is not recognizable as management at all in the sense of monitoring, manipulating and controlling.

The creative process is:

• Internal. — The idea precedes the finished form. In the case of software development, thought can be very close to the finished product. Attempts to monitor progress by such externals as number of lines of code or visible man-hours will almost certainly result in frustration and inaccuracies.

• Unstructured. — There are no maps here. The designer must be adaptable in order to accommodate new elements. He must be flexible and willing to change course many times, if necessary.

• Nonlinear. — Solutions frequently come "all at once." Much time may be spent pondering a problem until the relationships between key variables fall into place.

The designer then maps it into a linear, sequential format suitable for the finished product. In software design, the resulting program retains a close relationship to the abstract thought process.

Consequently, only another programmer can truly understand and appreciate what factors contribute to a program that performs apparently simple tasks.

The qualities of creative endeavors are the antithesis of the highly structured, predictable environment assumed by conventional management techniques.

Conventional managers, unable to see progress because of its internal nature, will evaluate people on the basis of appearance — if they look or act busy, they must be working.

Thus, projects are too often monitored by the number of lines of code generated or a formal schedule. These efforts siphon off creative energy and interfere with the internal time scale of the creative process.

Designers work under internal pressures generated by their relationship to the work being done. One hour at the right time can literally advance a project by weeks.

Bottom Line

How does this affect the organization's bottom line? Company profits are the result of human efforts. Initially, there was a creative effort required to set up any new company. Risk, unknowns and uncertainty are very obvious at that point.

As a company grows and begins to produce and market its products, the manufacturing process becomes all-important.

Financial success begins to depend on production capabilities. Every effort is made to ensure a predictable, consistent cost-effective product. The majority of the firm's personnel are engaged in operating and improving the "well-oiled production machine."

If Demand Disappears

The company may continue to operate for quite a long time in this mode — until the demand for its product disappears. It is not unusual for a product to become obsolete in six months in high-technology areas.

If new products are not developed and existing ones are not improved, the bubble bursts and doors suddenly close. Creative people make the long-term success of a company possible by providing new products for an ever-changing marketplace.

Wernick is a senior microprocessing engineer with Magnuson Computer Systems, Inc. in San Jose, Calif.

Alternatives Suggested

(Continued from Page 45)

Plastic smiles, a pat on the back and "I know you'll figure something out" are not satisfactory.

• Give people the resources they need to do the work. These include appropriate software and hardware tools, technical support in related areas and a quiet and comfortable environment.

• Trust and respect the staff. If a manager cannot do this, he either hired the wrong people or is not cut out to direct creative workers.

• Be appreciative. Even if you do not understand the details, it is your responsibility to understand the general concepts and the difficulties that developers must overcome.

• Be aware of each individual's need to work in his own way and allow him the freedom to do so. Measure the final results instead of the style in which they were obtained.

• Be tolerant of the many quirks and idiosyncrasies of human nature. They become more visible when the work itself is abstract and intangible.

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Data Briefs

Text, Graphics Capabilities Added for TI 743, 745, 763, 765

BURLINGTON, Mass. — Texprint, Inc. is offering multifunction text and graphics capabilities for Texas Instruments, Inc. Model 743, 745, 763 or 765 terminals.

Called Texplot, the enhancement package requires the addition of a plug-in board and pulley. Once installed, the TI single-function, 80-column terminal becomes a four-function terminal with 80 or 136 print positions per line and two high-resolution graphics modes.

Texplot costs $450 from Texprint at 8 Blanchard Road, Burlington, Mass. 01803.

GE Lowers Price Tags by $245 On Terminet 2030 Printers

WAYNESBORO, Va. — General Electric has lowered the cost of its Terminet 2030 keyboard send/receive tabletop matrix printer to $1,250 and its 2030 read-only units to $1,175.

Both figures represent a decrease of $245.

The 2030 features 60 char./sec printing and 1,200 bit/sec transmission, the vendor said from Waynesboro, Va. 22980.

Rixon Switching Mux Offers Automatic Traffic Rerouting

SILVER SPRING, Md. — The Rixon, Inc. DCX850 switching multiplexer is now available with automatic rerouting of traffic, according to the supplier.

The DCX850 now offers the following features: error-free transmission of up to 240 channels over as many as 12 composite links, port contention, network monitoring and centralized networking.

The price of the stand-alone version starts at $20,545, while the cost of the rack-mount version starts at $19,810. Rixon is located at 2120 Industrial Parkway, Silver Spring, Md. 20904.

Compre Comm's Sprint/Mux Gets Asynchronous Feature

CHAMPAIGN, Ill. — Compre Comm, Inc. has added an asynchronous composite feature to its Sprint/Mux multiplexer.

Asynchronous speeds of 2.4K-, 4.8K-, 9.6K- and 19.2K bit/sec can be selected.

The Sprint/Mux with its asynchronous feature will be available in June and is priced at $975, the vendor said from 51 E. Chester St., Champaign, Ill. 61820.

Terminal Handles Telex, TWX, DDD, Leased Lines

By Bruce Hoard
CW Staff

PORTLAND, Ore. — A six-port telecommunications terminal with floppy disk memory that was designed to accommodate any combination of telex, TWX, Direct Distance Dialing (DDD) or leased lines is available from Sidereal Corp.

Linked together, two of the Micronet 6 terminals, each of which comes with a 30 char./sec dot matrix printer, allow two users to send and receive messages concurrently. The 8-in. floppy disk memory features 2.3M bytes of virtual memory.

The communications ports of the Micronet 6 accept telex at 50 bit/sec; gateway telex, TWX and DDD at 110- to 300 bit/sec; and "freewheeling," or low-speed, 50- to 75 bit/sec international leased lines. IBM 2780 or 3780 Bisync and other synchronous protocols will be available by June, a Sidereal spokesman said.

The vendor's high-level Micronet Application Programming Language (MAPL) permits custom programming for special applications, he added.

Messsage Procedure

The terminal uses a simplified message preparation procedure that prompts the operator as he proceeds. It also provides a daily log of messages sent and received, along with their estimated billings and a graph of traffic load against time.

Message-switching capabilities convert one protocol to another automatically. For example, the terminal can go from Telex line signaling into Bisync, or vice versa.

The base price for a single-workstation Micronet 6, including the printer and one Telex line, is $15,900. Sidereal is at 9600 S.W. Barnes Road, Portland, Ore. 97225.

Wang Offers Protocol Updates, Two Matrix Printers for 2200

LOWELL, Mass. — Wang Laboratories, Inc. has unveiled enhanced telecommunications protocols and two bidirectional matrix printers for its 2200 series computers.

The protocols include emulation of the IBM 3274 cluster, providing access into both a bisynchronous and Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) environment.

The vendor also introduced support of X.25, X.21, enhanced 2780/3780 and teletex protocols, allowing 2200 users to communicate directly into SNA or X.25 networks while maintaining local system control.

The charge for bisynchronous 3274 emulation is $1,000; 3274 SDLC emulation costs $1,250. Support for both X.25 and teletex costs $500.

The Model 2235 printer prints 222 char./sec. The Model 5535 prints 181 char./sec and is installable on the vendor's word processing and office information system series.

Both printers are designed for business applications and high-speed draft printing in word processing applications.

The 2235 costs $3,500 and the 5535, $4,500, Wang said from One Industrial Ave., Lowell, Mass. 01851.

Total Teller Replaces IBM 3624

DALLAS — Docutel Corp.'s Total Teller 2300 series automated teller machines (ATM) can now emulate IBM 3624 ATMs and operate on-line in IBM 3600 networks as additional machines or as direct replacements for IBM units, the vendor said.

The 3600 Loop Interface hardware and software feature enables TT2300 ATMs to operate as part of IBM's 3600 Finance Communications System, while its 3624 Emulation package makes Series 2300 ATMs appear to be 3624 terminals.

Docutel's 3624 Emulation package costs $5,000 per customer. The 3600 Loop Interface costs $2,200 per ATM. Both are available in 90 to 120 days, according to Docutel, which can be reached through P.O. Box 222306, Dallas, Texas 75222.

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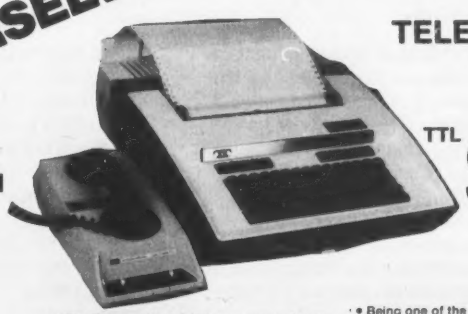

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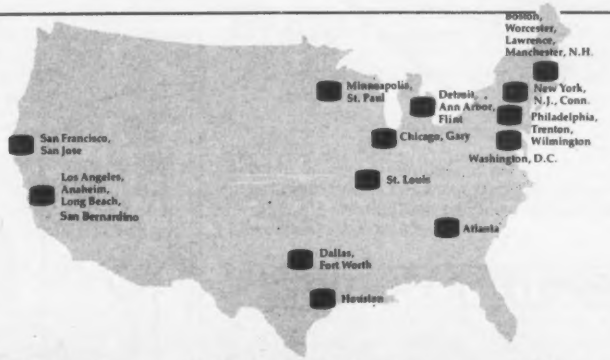

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Mux Interface Fits PE Gear

ANAHEIM, Calif. — Macrolink, Inc. is offering a communications multiplexer interface, called Comm Mux, that houses eight independent RS-232 asynchronous channels on a single 15-in. by 15-in. board. The board plugs into any available slot in any Perkin-Elmer Corp. processor.

Any four crystal-controlled speeds from 50 bit/sec to 19.2K bit/sec may be software selected for each of eight channels. Either half- or full-duplex mode may be selected and channels may be used for either modems or terminal interfaces.

The Comm Mux interface costs $1,900, Macrolink said from 1150 E. Stanford Court, Anaheim, Calif. 92805.

Cobar Terminal Emulates VT100

ANAHEIM, Calif. — Cobar, Inc. is offering a Digital Equipment Corp.-compatible terminal that emulates the VT100 with advanced video option.

The Model 3100 is designed for users who do not need the editing capabilities of the vendor's Model 3132 terminal. Standard features include nonglare screen, set-up prompt legends, 19.2K bit/sec operation and screen save.

The terminal costs $12,595 from Cobar at 1181 N. Fountain Way, Anaheim, Calif. 92806.

POS Terminal Accesses Files

MURRAY, Utah — An on-line, point-of-sale (POS) terminal designed for application areas requiring on-line interaction with accounts receivable, inventory or other files from the point of sale has been announced by Compuregister Corp.

The terminal uses an asynchronous RS-232 interface using an Ascii format and transmits at speeds up to 9,600 bit/sec, the company said. The terminal is plug-compatible with a number of other systems through use of an internal set of erasable programmable read-only memories (Eprom), the vendor said.

The POS 100 is priced at $7,950 with quantity discounts available from Compuregister Corp., Suite C-294, 5284 S. 320 W., Murray, Utah 84107.

MQI Terminal Handles APL

LAS VEGAS — MQI Computer Products has announced the Autoterm APL 900, a terminal that is compatible with the APL programming language.

The unit is based on a Televideo terminal and offers full overstrike APL, standard 96-char. display, a 24-line by 80-char. display and local and remote control of block/conversational and APL/Ascii modes, the vendor said.

The unit also features comprehensive cursor controls and user editing features.

The terminal costs $1,395, the vendor said from 2615 Miller Ave., Mountain View, Calif. 94041.

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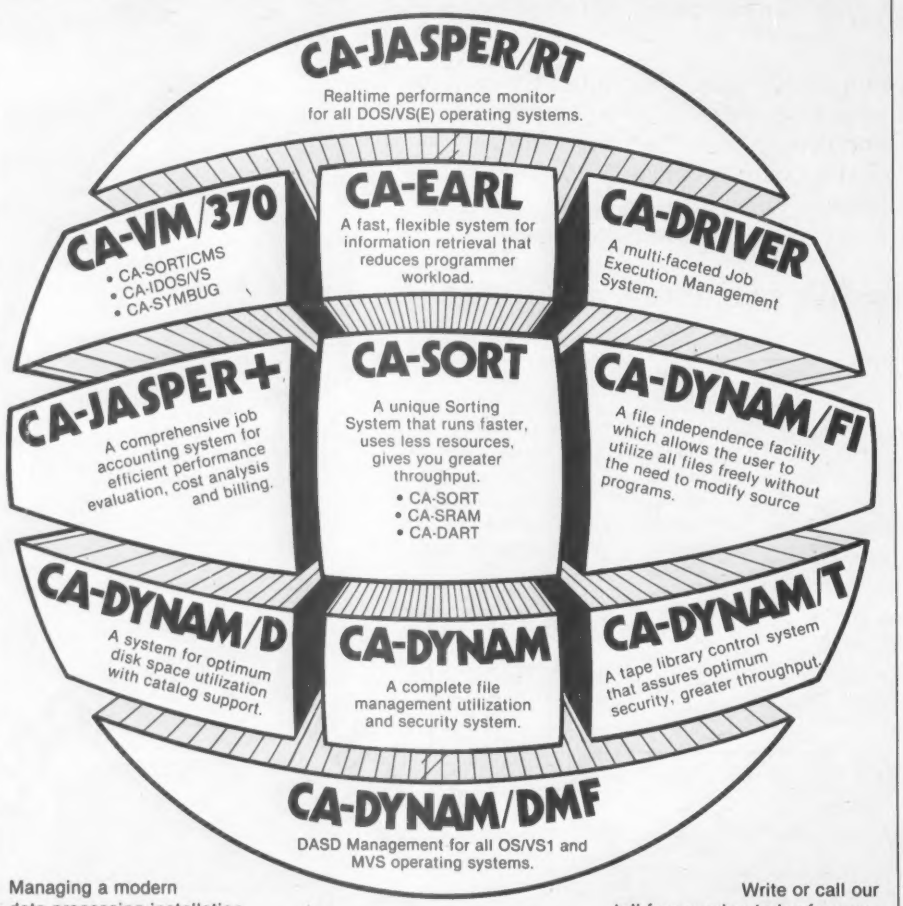
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Software Links DG Minis To Sperry Univac CPUs

PALO ALTO, Calif. — Data communications software that reportedly will allow Data General Corp. Nova and Eclipse minicomputers to connect to Sperry Univac mainframes using the NTR remote job entry protocol is available from Gamma Technology, Inc.

The NTR Workstation software supports all standard features of the protocol, including multiple I/O streams, a console, full-duplex operation, space compression and remote operator control over output peripherals, according to the vendor.

The software interfaces with DG's real-time operating systems RTOS, RDOS and AOS. Any peripheral supported by the operating system may be used for input or output, and each I/O stream is treated independently and can be assigned to different peripherals, the spokesman said.

The initial CPU license fee is $2,750, with discounts available for multiple sites or OEM sales, the vendor said.

Available immediately, the program is supplied on 9-track, 800-bit/in. magnetic tape from the firm at 2452 Embarcadero Way, Palo Alto, Calif. 94303.

Unit Emulates Burroughs TD-830 With Independent Printer Port

FREMONT, Calif. — A CRT terminal said to completely emulate the Burroughs Corp. Model TD-830 has been announced by Emulog, Inc.

The Series 900 comes equipped with 8K bytes of random-access memory and is either RS-232- or TDI-selectable and features an independent addressable printer port, Emulog said.

The terminal also features a detachable keyboard, dual-page capability and built-in concatenation, the company claimed.

With a 30-day shipping time, the Series 900 is priced at $1,895 from Emulog, Inc., 3730 Yale Way, Fremont, Calif. 94538.

Emulog's Series 900

Terminal Control Units Added To Bunker Ramo System 90 Lines

TRUMBULL, Conn. — Bunker-Ramo Corp.'s Information Systems Division has announced the 90/50 series of programmable terminal control units to augment its Bank Control System 90 and System 90 product lines.

The units control on-line, off-line or both types of transaction processing for branch banking and other distributed data processing environments, the vendor said.

The 90/50 series features up to 256K bytes of internal memory and an optional dual- or single-sided integrated floppy disk drive with auxiliary storage capacity of 256K bytes to 512K bytes, respectively, the vendor said.

The series costs between $6,000 and $15,000, depending on the types of terminals used, the number of terminals and the complexity of the functions they perform, the vendor said from 35 Nutmeg Drive, Trumbull, Conn. 06609.

Codenoll Optical Links Debut

YONKERS, N.Y. — Codenoll Technology Corp. has unveiled two optical data links.

The Codelink-20 provides synchronous transmission of clock and data signals for DP, word processing and process control applications, the vendor claimed.

The product can transmit fully encoded data and clock signals at data rates of 10M bit/sec and is compatible with the Ethernet data network and other data network systems.

The Codelink-100 can transmit data at rates up to 10M bit/sec, he added, saying with the addition of the optional Codedata-100 modules, the 100 can transmit a simultaneous clock and data signal at data rates of 50M bit/sec each.

Prices for the Model 20 and 100 are $625 and $3,425, respectively, the vendor said from 1086 N. Broadway, Yonkers, N.Y. 10701.

RF System Gains Mobile Printer

RAMONA, Calif. — Printer Terminal Communications Corp. has unveiled a mobile printer system as an option to its radio frequency Local Area Data Distribution system.

The Model RP400 consists of a printer, address and control electronics, power supply, receiver-decoder and antenna. Print speed is 120 char./min in 40-col format operating on 12V dc power.

The Model RP400 costs $2,975 from the vendor at 124 10 St., P.O. Box 535, Ramona, Calif. 92065.

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36 Megabytes. Under $13,000.

The C3-C computer has been designed and engineered to fill the void that existed between floppy disk systems and larger hard disk systems.

In its normal configuration, the C3-C includes the Challenger III processors, 52K RAM, the 36 Megabyte Winchester drive and dual floppy drives for file system back up. And the cost is less than $13,000.

The CPU employs three microprocessors, the 6502A, the Z80A and the 68B00. And the processor bus has been designed so new, more powerful micros (like 16 bit CPU's) can be added to the system later on.

There are also 10 open slots in the basic C3-C. The system supports up to 384K bytes of memory, in a multi user configuration.

The C3-B.
74 Megabytes. Under $15,000.

For those who require even more hard disk storage, Ohio Scientific offers another microcomputer in the C3 Series, the C3-B. Its specifications are the same as those of the C3-C. However, the C3-B offers a 74 Megabyte Winchester drive.

For those who do not need hard disk capacity now, but in all probability will need it in the future, Ohio Scientific offers the C3-A. It is like the C3-B and the C3-C in all respects but two. 48K RAM is standard in the C3-A, and it offers 12 open slots. When more storage is needed, the C3-A is easily expandable to either a 36 Megabyte or 74 Megabyte hard disk system. The C3-A is priced at less than $6,000.

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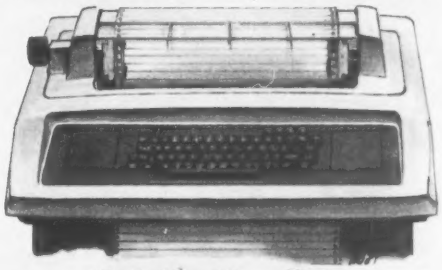

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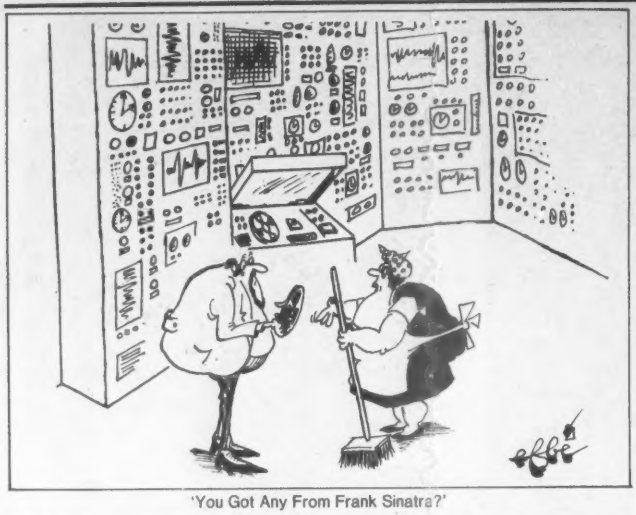


'You Got Any From Frank Sinatra?'

Data Briefs

Micro-Implemented Set Replaces Bell 208 Modem

LARGO, Fla. — The Model 4800/208AB microprocessor-implemented data modem being offered by Kinex Corp. is designed for use on domestic and international dial-up and leased lines.

The modem permits replacement of a telephone company 208 modem on a one-at-a-time basis without shutting down the data transmission system.

It can also be applied to users requiring a 4-wire, private-line, full-time system with occasional need for 2-wire dial-up connection with another 208B.

Prices for the modem start at $2,750 from Kinex at 6793 Cross Bayou Drive, Largo, Fla. 33543.

Multidrop Feature Added To DCA System 205 Mux

NORCROSS, Ga. — Digital Communications Associates, Inc. (DCA) has added a multidrop multiplexing capability to its System 205 Unibus Interface statistical multiplexer.

With this capability, offered at no extra charge, the DCA System 205 can control other DCA statistical multiplexers dropped from a single telephone line.

The System 205 costs at least $4,250, DCA noted from 303 Technology Park, Norcross, Ga. 30092.

Intelligent Modem Offers Bell 103 Compatibility

MENLO PARK, Calif. — A modem reportedly compatible with a variety of microcomputers and with the Bell 103 protocol has been announced by Bizcomp Corp.

The Model 1084 Intelligent Versamodem allows full automatic dialing and auto-answer capability controlled through a RS-232 interface and has a data rate preset to 300 bit/sec, the company said.

Available with four weeks notice, the Model 1084 costs $295 from Bizcomp Corp., P.O. Box 7498, Menlo Park, Calif. 94025.

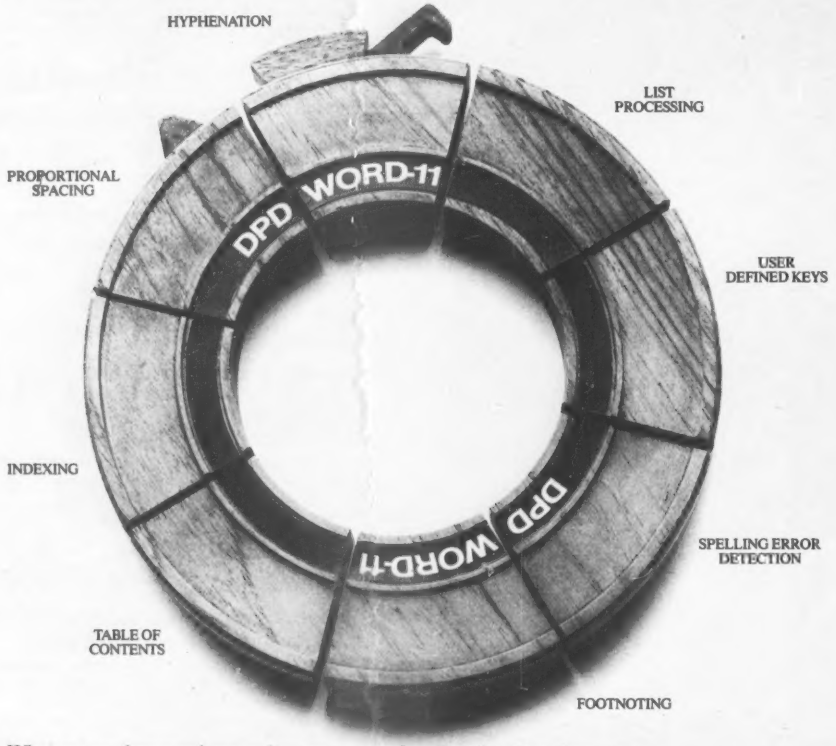
Terminal Geared for Use In Hostile Environments

SALINE, Mich. — A second-sealed industrial terminal with keyboard for interaction with remote electronic devices and designed for use in hostile environments has been announced by Xycom, Inc.

The Model 4815 operates asynchronously and is available with RS-232C as well as optional fiber optic, 20mA current loop, RS-422A or RS-423A interfaces, the company said.

The Model 4815 costs $3,550 from Xycom, Inc., P.O. Box 984, Ann Arbor, Mich. 48106.

The Whole Truth About PDP-11 Word Processing.



When you explore word processing systems, you'll find a number of systems that offer part of the package. And frankly, if you're only looking for text editing, almost any system will do.

But if you're looking for full word processing capabilities, you should insist on a system that can handle all of the tough tasks you'll encounter.

For starters, a good system will have list processing, the vital function that generates correspondence, reports, even statistical analyses. It should have user defined keys to simplify repetitive operations.

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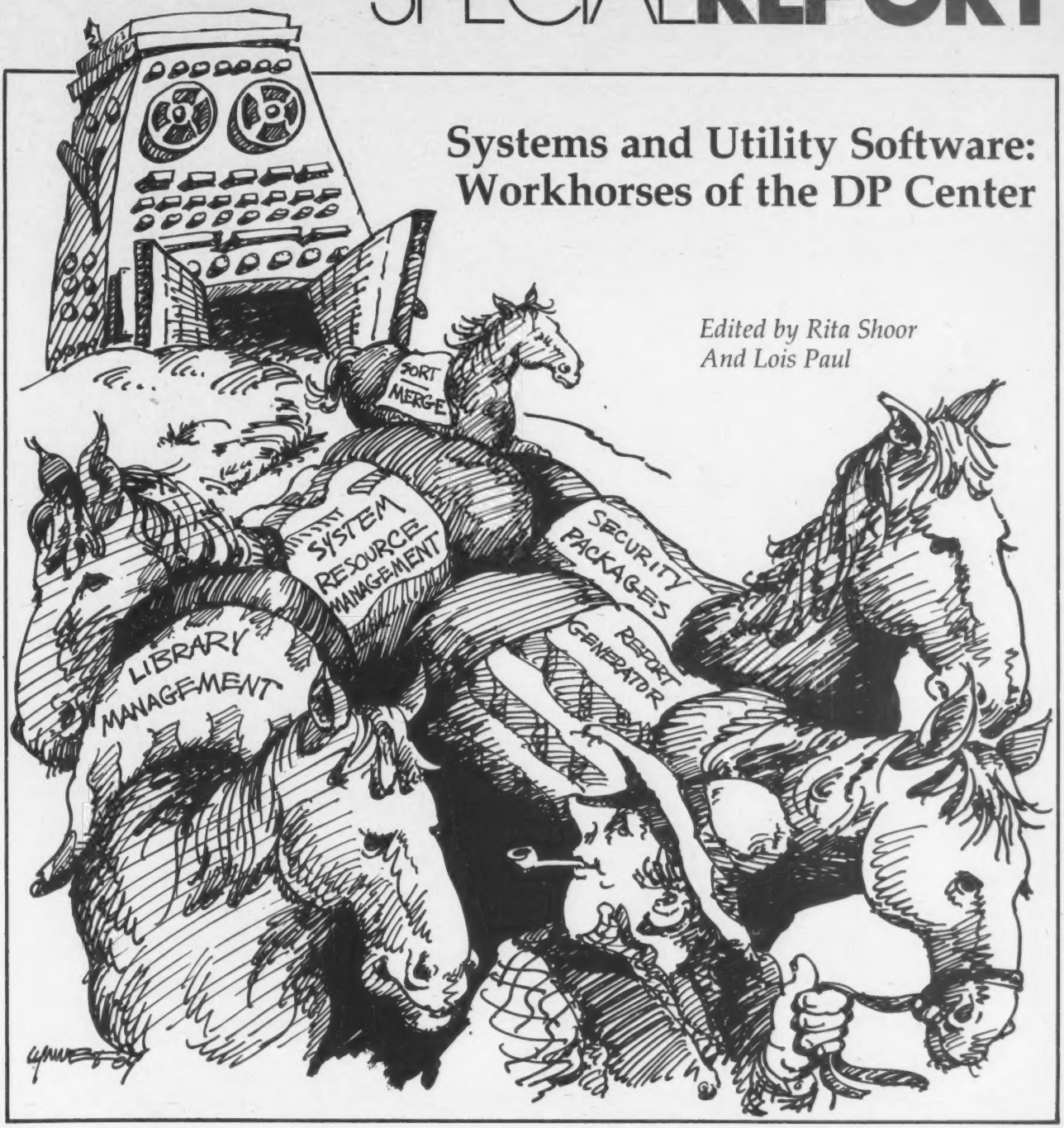

Systems and Utility Software: Workhorses of the DP Center

Edited by Rita Shoor
And Lois Paul

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Evolution Traced

Report Writers Most Prevalent Workhorses

By Robert T. Shimer
Special to CW

Report writers are the most prevalent workhorse software packages with which many application programmers have dealt.

On early systems (post-Eniac and pre-IBM 1401), the amount of time that development would consume was often a program's most significant characteristic. Early computer installations were not prepared for the level of effort required, and since many shops had just one computer, it appeared that development would have to cease after a few large systems went up.

These pioneers were looking for something to speed up object program generation. Assembling and compiling times were major costs at that time and users complained loudly when large systems taxed available computer resources.

IBM presented the concept of a cut-down process similar to assembling as a solution. This would require relatively simple source code to produce limited amounts of object code. The process was eventually referred to as "generating," probably to emphasize its conceptual differences from compiling and/or assembling code.

Generator developers began their work by looking for ways to improve the process of assembling instructions that produced an object program. One obvious method for achieving efficiency in the report writing process was adopting a simple technique for coding instructions. Another step was to increase the use of defaults and to restrict selectable options.

The first generators required the user to punch parameters and instructions into fixed card-column locations. Since most technicians were working with punched card formats back then, this did not appear to be a major restriction; RPG, in fact, still has this type of coding format.

Developers also relied heavily on defaults and reduced the variety and flexibility of available options. Users were encouraged to accept standardized reports. An option might allow variations in the number of heading lines printed in a report, but some practical limit such as six or eight lines was usually established.

These software creators had also noted similarities in data presentation and summarization methods among many reports. The macro concept was therefore used in a way that employed fairly extensive precompiled routines. These routines provided variations in relatively restricted terms. Perhaps the most popular macro-type feature was the provision for rolling totals forward from the most detailed level of data to the production of the bottom line or grand total at the end of the report.

Two of the earlier report generators were Fargo and RPG. Few users still code in the former language — it came in with IBM's 1401 and died with that hardware. But its concept survived in RPG and in the Cobol Report Writer feature among other software products.

Based upon my experience, other generators using concepts that may have drawn heavily on these predecessors include Pansophic Systems, Inc.'s Easytrieve and Dylakor Corp.'s DYL-250 and DYL-260 packages. Mark IV from Informatics, Inc. also seems to have similar features, although it was designed to be part of a more extended generator development system.

Report generators and related utilities may owe some of their popularity to their tie-in to structured concepts. The fixed format is actually nearly as self-documenting as a well-written Cobol or Fortran program should be.

However, some users prefer quick and dirty program development that is more limited than conventional development with language processors offering a full set of bells and whistles. The system developer working with these users must accept the fact that he will never document his programs. If a programmer knows this at the beginning of a project, it is preferable to accept the generator's limitations, since the package at least tends to enforce some type of standardization.

Report generator software has been around for a long time. But these products still have a bright future among application programmers who are quite willing to turn report maintenance over to end users that can utilize these tools. Shimer, a free-lance consultant, traces the development of report generators and maintains that several of the independent vendors' packages drew heavily on early languages like Report Program Generator (RPG) and Fargo. He also argues the case for going with Cobol's Report Writer feature, when applicable, rather than purchasing a separate package.

Generated systems are doing away with the typical multiple file match and multiple file update program because it is much easier to generate a series of matches with utility software than to code a five-file match and update program. These generated modules can also produce balancing reports when needed and are often easier to maintain than programmer-coded modules.

System costs and complexities vary to a great degree, and it is still true that complex problems and procedures must be handled by programming staffs using traditional language processing methods. Generators are not yet ready to completely replace other system development methods. They can be improved to accept screen formats and function interactively, but are still, in essence, the same limited software that was available in the days of punched cards.

If there is time and occasion to fully document the system, consider Cobol's report writer. It is only slightly more difficult to write a report using this feature than it is to use some of the current generator packages, and there are advantages to be derived from formatting a print line by print column locations.

It is often easier to communicate user requirements with reference to where a data item now appears in the report than in any other context. While it may jar one's aesthetic sensibilities, it is a very pragmatic approach to generating some reports. And, the Cobol report writer extends the ability of language processor users to compete with a utility report writer like Mark IV.

But the decision to go with Cobol, Fortran or some other source language need not rule out using generators. Generating a stand-in or interim version of a program can often provide more time when fuller development or output additions and/or corrections are necessary.

It is also unwise to place too much emphasis on competing or alternate strategies for producing reports or any other type of system output. While some people feel that generator utilities may threaten the craft of application programming, members of the supposedly endangered group are not fighting back at all.

In truth, many of them are looking forward to passing on the responsibility for maintaining report writers to their end users. It is probable that most application programmers would prefer to let someone else make tedious, cosmetic report changes. Learning to make their own changes is the first step to end users taking over report development itself, thus freeing the programmer for other application development tasks.

Shimer is a California-based information systems consultant.

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System Generators Best in Long-Term Projects

By Kim Jones
Special to CW

System generators can drastically cut the time and costs of traditional development methods and can produce superior documentation as a by-product. But, while they can be profitably employed on short-term projects, they perform best in companies planning for the long term.

In order to compare the system generators, managers should understand how they work and what they demand from users. Traditional in-house development of application systems software usually results in a system that comes in late and over budget by as much as 300%. Meanwhile, 80% of the system cost still lies ahead during maintenance.

Yet, the demand of the development and modification of application systems continues to grow with average backlogs measuring two to three years. There simply are not enough qualified programmers and systems analysts available to meet this demand as a result of the combination of several factors:

First, developing expertise about an application or an industry is extremely difficult given the industry-wide high turnover among the staffs developing the systems.

Second, application systems usually reflect the individual approaches of their creators. When those individuals leave an organization, their programs are difficult to modify because they were not initially defined and implemented in a standard fashion.

Third, although most DP managers have installation standards, their enforcement is typically weak, documentation tends to be incomplete and maintenance is difficult.

Application generators are designed to alleviate these problems.

Four different design approaches have been taken in automating application generation and each has different capabilities. These approaches include "link-edit" modules, table-driven interpretive procedures, program generators and macro-driven generators (see Figure 1).

While most information systems executives agree on the need for "application generator" tools, the term itself is often used to describe distinctly different products. Jones clarifies these differences and explains how a generator can aid in system design.

The "link-edit" level module was probably the first attempt to automate part of the development process. Products of this type manipulate and interrelate blocks of object code in order to produce an executable program. Although they cannot technically be regarded as true generators, the technique is an important step up from coding 100% of every program in a system. The major limitation is that cataloging and reusing link-edit modules that are both specific and efficient is often difficult.

Table-driven interpretive procedures, sometimes known as runtime variable programs, represent the second approach to automated development, and they have become increasingly popular as internal machine times become faster.

This approach lets the user build and maintain a set of tables describing the details of the processes to be performed such as report, screen and file formats as well as rules for manipulation, calculation and editing. He then executes a general procedure that retrieves the necessary tables and modifies its own execution to perform the specific functions described in the table.

At present, the table-driven approach has two limitations: Its functions are limited to elementary report and screen formatting, file manipulation, calculations and editing; and it increases execution time, since the generalized program must modify itself as it executes — an obvious drawback in a heavily used application system.

The third attempt at automating application generation has produced the type of product known as a program generator or precompiler. Typically, it consists of a parameter-driven program or a series of programs that will generate other programs as output. In certain cases, one input parameter can produce many source code statements, but these are typically blocks of copied code that vary little each time they are output.

The fourth type of application generator uses a macro-driven process — either with actual macros or through simulated macro functions. Unlike the program generator, a macro-driven generator allows the inclusion of uniquely modified blocks of code.

The macro generator thus provides a generalized process that can be specified in particular at the point when the macro process is executed.

Broader in function than conventional macro instruction, the text-producing macros used in this type of generator are parameter-controlled. They can produce design and system documentation as well as program code.

In the remainder of this article the term "application generator" will be used to refer to macro generators for Cobol programs. It should be kept in mind that it is also possible to generate other source languages.

Application generators alter the traditional approach to development based upon four concepts:

• Over 80% of the code for most

(Continued on SR/4

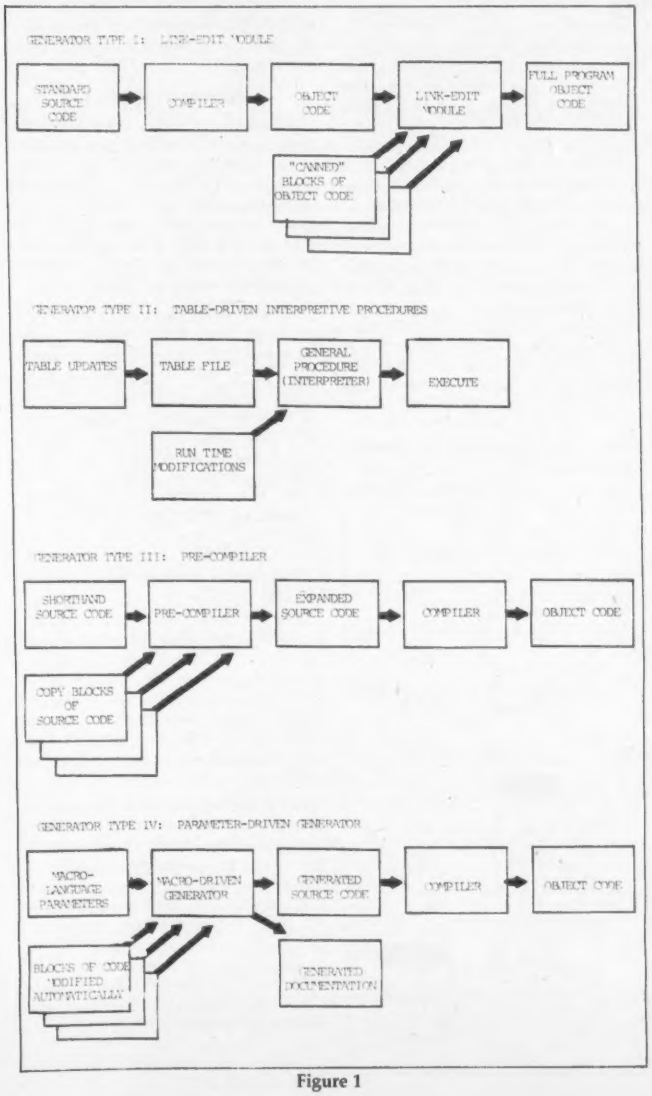

Figure 1

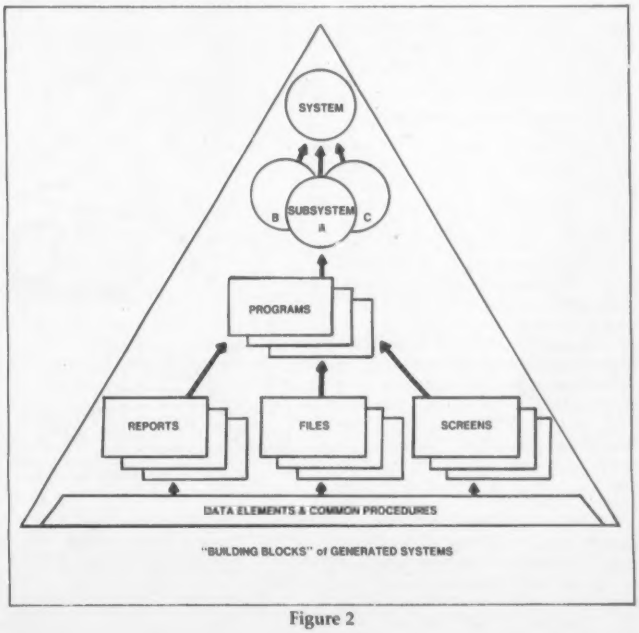

Figure 2

Application Generators Realize Design Goals

By Kim Jones
Special to CW

Once a system design is established, what happens during the programming process? Ideally, there should be a direct connection between the design and the actual programs produced; programming standards should be enforced; management can review the work done by the programming staff and measure its performance; and schedules with relatively short intervals can be tracked and milestones established to check on project progress.

An application generator can make these goals achievable. Since it produces source code from the same inputs that produced the design documentation, there is a one-to-one correspondence between the two elements.

Application generators for Cobol programs, but it should be kept in mind that it is also possible to generate other source languages.

When a generator is used to produce code, enforcing program standards becomes a mechanical rather than a human process. Consistent program structures and naming conventions become difficult, if not impossible, for the programmer to override. Thus, it becomes easier for the programmer to follow the standard than to break or ignore it.

Besides helping with system design (see story on Special Report/3), application generator packages have a definite impact on program coding and the responsibility assignments within a project development team. Jones discusses the effects of these changes and provides some criteria for selecting application generator software.

Verbosity Decreased

As programming languages have progressed to higher levels, verbosity has decreased. Just as the ratio of Cobol to assembler is one instruction too many, the ratio of application generator inputs to Cobol instructions is 1:10 or more. That can mean that the programmer needs to review 30,000 lines of code rather than 300,000, and the task becomes manageable.

Since most of the Cobol statements are created automatically from the design input to the application generator, large portions of the code are debugged before testing begins. This allows testing to focus on the programmer-added code.

These generators also tend to alter project management within a development team. In the usual setup, an analyst/project leader is responsible for design on a large project. His aides include a subordinate programmer analyst and a small group of programmers.

Using an application generator typically changes this project team's makeup so that it consists of two analysts for every one programmer. This team can sometimes more than double the productive output of the more traditional team because the application generator now automatically produces the code implied by the design parameters. The team can now focus on the remaining procedural code, the code unique to a particular system, which implements the rules captured narratively in the design documentation.

After the DP director has made the decision to take advantage of an application generator, the next step becomes an evaluation of available packages. Flexibility, transportability and maintainability of the systems produced via the generator should be the main criteria during the selection process.

Package Evaluation

Flexibility. In today's applications environment, no single piece of software will address all problems. Therefore, the number of teleprocessing monitors, data base handlers, data dictionaries and other software tools is constantly growing. A generator must either interface with these packages or perform their functions.

Transportability. Because people are regularly moving among both hardware and operating systems environments, the code an application generator produces should work on more than one machine. High-level languages by themselves provide only a partial solution to this problem. For example, IBM DOS-to-OS Cobol conversions have a tendency to drag on endlessly. Although in theory the Cobol for these systems should be relatively easy to convert, things don't always work that way in the real world.

Maintainability. Inability to maintain a system is probably the greatest single reason it is scrapped or abandoned by its users. If an application generator provides complete system documentation from the same source as the Cobol code, maintenance and enhancements to the system become easier to handle.

Naturally, application generators cannot guarantee that end users will be satisfied with a system's design. But these products put together a one-to-one relation between design and code, utilize the fact that most of the code for application systems is predicatable, provide large blocks of debugged code and let system developers include hard-earned installation and application knowledge within the generator itself.

Jones is a vice-president with Genasys International, Inc.

Generators Best for Long Term

(Continued from SR/3)

commercial applications is predictable.

- Machine-assisted design and implementation makes system development a science rather than an art.
- A routinized development methodology improves user DP communication.
- Predetermined programming standards reduce development time and make maintenance easier.

The traditional approach to software development effort has consisted of an ordered sequence of activities on the surface that appear to be scientific. In reality, the work within these activities is often confused, particularly during the design stage, when a great deal of interaction is needed between those planning to use the system and the system developers. All too often, the fact that many of the specifications are similar or identical to those in existing systems is completely ignored.

Application Generator

An application generator, in contrast, organizes the design and programming of systems. In effect, it forces the design to take place in terms of building blocks — a hierarchy starting at the top with the system and proceeding downwards with subsystems, programs, reports, files, screens, data elements and common procedure (see Figure 2).

Since each building block requires that a relatively predictable set of information must be gathered, this frame of reference allows analysts and programmers to have a consistent place and format in which to capture all design data, without necessarily changing the information-gathering technique.

The design of an application system usually begins with an analyst's sitting at a clean desk with a fresh pad of paper and a mental picture of what the system should look like. The designer is not scientifically building on a base of knowledge consisting of similar systems that have already been developed.

A generator alters design activity by changing the analyst/end-user communication. The analyst designs the system and presents it to the user for evaluation, refining and modifying of the design.

The application generator also automatically produces design documentation. Machine production of the design document encourages an iterative design process during which the design documentation can be reviewed, refined and reproduced as often as necessary.

One common complaint is that a generator cannot produce complete programs and forces a dual-language solution — one part in generator code and the other part in Cobol. In fact, a well-designed generator will let you generate 100% of Cobol code.

There is also a feeling among some technicians that generators produce inefficient code. It is possible to avoid this with a library-driven generator that captures experience on a continuing basis and place and stores it in the generator's macro library.

Finally, there is the contention that generators are too copy-oriented and simply include large blocks of source code in a program verbatim. Macro generators, however, create source code that is totally specific and unique to the given program problem. All specifications for a particular function are analyzed before the source code for it is generated.

Jones is a vice-president with Genasys International, Inc.

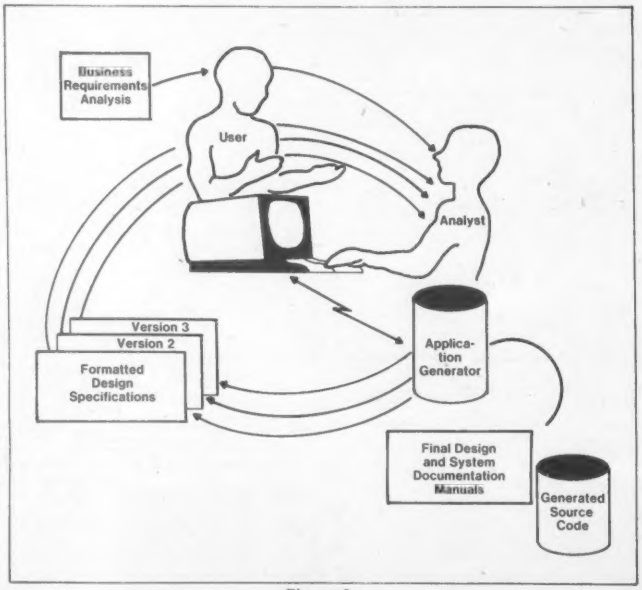

Figure 3

At Procurement Time

Software Still Taking Back Seat, Report Says

PENNSAUKEN, N.J. — Although hardware costs have been declining in recent years while software costs have remained stable or increased, organizations shopping for a DP system still tend to concentrate more on the hardware components, often treating software procurement almost as an afterthought. These are the general findings of Thomas R. Cikoski, a data systems consultant, in a report entitled "The Software Procurement Process" from Auerbach Publishers, Inc. here.

The article is part of Auerbach's *Computers in Local Government: Finance and Administration*, a loose-leaf reference series for local government specialists. Although Cikoski's focus is on software procurement within local government, his comments regarding cost consideration, analysis of software and the procurement process are generally applicable.

Cikoski maintained that software procurement is important because its cost is generally the largest expense in the cost of a total DP system and, with few exceptions, software quality determines the ultimate success of the entire system.

Rising Costs

Each year, computer hardware costs have declined dramatically, while software costs have held steady or increased, Cikoski explained.

He described hardware as a product of technology, which has demonstrated almost overnight advances in the state of the art. Software remains a labor-intensive product, subject to the rising cost of skilled workers, the report continued.

In addition, Cikoski noted there is a difference between the apparent cost and the true cost of software. He identified the apparent cost as the short-term cost of procuring and installing a particular software product. (The sum of the costs associated with the software-related items listed in Table 1.) It is this price tag that is often used in evaluating software purchases, according to Cikoski.

The true cost of software, he explained, is the sum of the apparent costs, plus the costs associated with those items listed in Table 2. These costs are rarely considered during the procurement process and they help determine how well the selected software does its job.

Because hardware that provides consistent, reliable service is readily available for prospective users, computer systems generally stand or fall on the basis of the quality of their software, the report continued.

Problem software can lead to increases in overtime, staffing, equipment purchases and exposure to any of the unanticipated costs listed in Table 2, Cikoski explained. He emphasized that the software procurement process should be given at least equal and preferably even greater attention than hardware procurement.

Table 3 of the report lists guidelines for software procurement that address points such as budget, time, training and documentation and maintenance.

Regarding budgetary guidelines, Cikoski noted that the ideal would be a combination of custom tailoring and mass production that will achieve a usable product at a reasonable cost. He asserted that it is misleading to compare the $17,000 annual salary of a programmer with the $20,000 initial cost of a complete packaged software system and conclude from this that it is less expensive to do the programming in-house.

It is only less expensive if no packaged systems fulfill the user's needs and if an in-house programmer who is capable of creating the needed programs is available, according to Cikoski.

The report included the following list of elements that can help put software quality in perspective:

(1) The overall computer experience of the software vendor.

(2) The amount of experience the vendor has in particular applications of software under consideration.

(3) The extent to which the software meets the realities of day-to-day operations.

Time Estimates

Time estimates for software development should be conservative, Cikoski maintained, adding that fallback plans should be established in case the software is late. Packaged software eliminates the problem of development time, but the time required to bring the system into operation must be accounted for.

Whether a software system is custom or packaged, it is only as good as the users and operators who work with it, the report continued. The training can involve formal classes with professional instructors; on-the-job training; self-teaching materials or self-teaching software. Accompanying this training is documentation which consists of a user's manual, a reference manual and program documentation.

Software maintenance involves correcting program errors and making program changes as dictated by operational requirements. Ideally, the correction of program errors should not have an impact on the procurement process, Cikoski explained.

He cautioned that the prospective

(Continued on Page SR/8)

Costs Associated With Software Products

Program License Fee: The fee charged by the software vendor for use of the software for a specified period of time. The fee can be a one-time charge or a recurring charge and can also vary according to the hardware used and the size of the installation.

Installation Charge: A one-time fee charged for installing the software on user hardware. The fee may or may not include travel and temporary living expenses for the vendor's installation crew.

Maintenance Fee: A recurring fee charged to offset the cost of program changes required or desired by the user (other than the correction of errors in the programs). The degree of change is usually limited.

Source Code Change: The fee charged for making program source code available to the in-house programming staff. The source code is not required for normal operation of the system.

Custom Programming Charges: Charges made for any program changes that are unique to the vendor's package. These charges are usually an hourly or daily rate for the time needed to make the changes plus travel expenses if the changes must be made on-site.

Conversion Programming Charges: Charges for a special programming required to convert existing data files to a new system is usually not covered by the installation fee.

Documentation Charges: A specified number of copies of user documentation will be included in the program license fee; additional copies are charged to the user. Some vendors also charge for all revised issues of the documentation.

Training Fees: A certain amount of training is often included in the installation charge or the program license fee. In-depth training programs are usually charged separatedly.

Transport Media: A separate charge may be leveled for the media (e.g., magnetic tape, or disk) used to transport the software from the vendor to the customer site, especially if the medium is one of the more expensive high-density magnetic disk units.

Users Group Dues: Associations have been organized to include users of widely distributed software packages; such groups are worthwhile but often charge dues in order to join.

Table 1

COSTS ASSOCIATED WITH POOR-QUALITY SOFTWARE

Overtime or the need for additional staff (particularly part-timers) caused by operations that are behind schedule.

Lost revenues resulting from poor or untimely recordkeeping.

Lost discounts on purchases not paid for within the discount period.

Cost of of extra equipment purchased in an attempt to improve productivity.

Cost of additional software purchased or developed in-house in an attempt to increase productivity.

Increased audit activities and associated fees incurred by poor recordkeeping.

The general, indefinable costs of poor productivity, low staff morale and inefficient operation. The unlikely but potential costs of:

- Labor problems caused by failures in payroll operation.
- Legal fees for suits brought on as a result of operating errors.
- Fraud or embezzlement.

Table 2

GENERAL GUIDELINES FOR SOFTWARE SELECTION

1) The cost of software increases in direct proportion to the amount of custom programming desired or required by the buyer.

2) The long-term cost of software increases in direct proportion to the degree of mismatch between the capabilities of the software and how it is actually being used.

3) The long-term cost of software is inversely proportional to its quality.

4) Most software development takes longer than anticipated.

5) The sum of program development time and operation conversion time is equal to the time required to bring a software system into full operation.

6) The money and time saved by the curtailment of training will be spent later (several times over) through inefficient and improper use of the system.

7) In general, large software and hardware vendors provide more extensive training and documentation.

8) Software should be procured with the inevitability of change in mind.

Auerbach Tables

Table 3

Report Zeros In on Package Selection Process

The first part of the data systems consultant Thomas R. Cikoski's report, "The Software Procurement Process," which is summarized on Special Report/5, describes the preliminary analysis required before acquiring software.

With this information in hand, users can look to the second part of the report, part of Auerbach Publishers, Inc.'s *Computers in Local Government: Finance and Administration*, which explains how to choose the most appropriate software package.

The report describes methods by which local governments can gather information about the variety of products available from software vendors, and these are generally applicable.

Resources include industry surveys, inquiries of other local governments, consultants, periodicals, trade shows, conventions and major computer vendors.

The report's question-and-answer guidelines (see table below) provide initial direction to procurement plans for the type (custom, packaged or a combination of both) and the source (in-house, independent programmer, software/turnkey vendor or mainframe vendor) of software that the local government will be procuring.

Cikoski maintained that packaged software generally has an advantage over custom software in lower long-term cost, faster time to full operation, better training and documentation and better maintenance.

Custom software should be contemplated only for those functions for which packaged software is not available or does not meet the specific user's needs, he explained.

If the custom route is required, the best source is an in-house programming staff that is stable, experienced and has time available for software development, according to Cikoski. He advised caution in dealing with a part-time moonlighter.

Another suggestion for in-house development was procurement of a specialized software development tool, such as a data base management system or file management system. Again, however, Cikoski emphasized that these tools are best used by an in-house programming staff.

The report continued with guidelines for preparing software specifications in order to solicit vendor proposals. These specifications should be created by functional area. They should include an estimate of data size parameters.

The desired operating mode and data entry method should be part of the specifications. The availability of training and documentation must be established before acquiring any software, Cikoski emphasized. A final guideline involves specifying unique requirements.

Soliciting Bids

Most local governments purchase equipment and services by soliciting bids and then awarding the contract to the lowest bidder. Cikoski explained that procurement of computer software should not be handled in this manner. Specifications are only a broad outline of what is sought. The vendor is expected to propose a product to solve the solicitor's software problem.

A negotiated procurement is suggested in which vendors are solicited with a request for proposal (RFP). The RFP states the local government's needs and estimates how these needs should be met.

The vendor can follow this with a specific product proposal that includes prices, timetables, product specifications and other specialized features the vendor is willing and able to provide. It should include a due date for all vendor responses.

Vendors can then give demonstrations and person-to-person sales talks to the decision-making body.

The RFP includes the complete statement of software needs and the software specifications. Cikoski suggested specifying a standard format for vendor responses that will make comparison easier. Questions should be specified. The name and telephone number of a contact person within the organization should be included.

The report included the suggestion that a mailing list of vendors be developed from the initial vendor survey. Records should be kept of all vendors who have received the RFP so any modifications or clarifications resulting from vendor questions can be distributed.

Proposal Check

The general evaluation process is summarized as beginning with a check of all proposals to ascertain compliance with the minimum specified requirements and a rejection of those that do not comply.

The next step is to rate the remaining proposals according to the set of weighted standards developed by the decision-making group. If no clear winner emerges from the scoring process, the two best candidates can be contacted and the user can negotiate for any required changes.

Cikoski suggested maintaining a conservative, even somewhat skeptical, frame of mind throughout the procurement process. He applied this advice specifically to local government users, noting that the application of computers to administration is still in its adolescent stage.

However, his advice is more applicable to most DP environments. It involves planning fall-back measures in case schedules are not met, especially in dealing with custom software. He also suggested tight management control over software procurement and utilization.

Step No.	Question	Go to the Indicated Step if Answer is: Yes	No
1.	Is this a standard application of software?	2	23
2.	Are you also procuring hardware?	3	11
3.	Does the hardware vendor offer the software required?	4	11
4.	Does the package lack any significant features?	6	5
5.	Consider hardware vendor as first choice for supplying the software.	—	—
6.	Is there an in-house programming staff?	7	9
7.	Does the programming staff have the time and resources to handle the software project?	8	9
8.	Consider having the in-house staff tailor the hardware vendor's software.	—	—
9.	Will the hardware vendor make changes to the software?	10	11
10.	Consider having the hardware vendor tailor the software.	—	—
11.	Is there packaged software available for the installation's hardware?	12	23
12.	Does the software lack any significant features?	14	13
13.	Consider the packaged software as first choice.	—	—
14.	Will a software vendor make modifications at an affordable price?	15	16
15.	Consider having a software vendor tailor the software.	—	—
16.	Will the software vendor allow modifications?	17	23
17.	Is there an in-house programming staff?	18	22
18.	Does the programming staff have the time and resources to be involved?	19	20
19.	Consider having the in-house staff tailor the software vendor's package.	—	—
20.	Is there an independent software house capable of tailoring the package?	21	22
21.	Consider having the independent software house modify the vendor's package under supervision of the in-house staff.	—	—
22.	Consider custom programming from a reputable independent source.	—	—
23.	Is there an in-house programming staff?	24	22
24.	Does the programming staff have the time and resources for a custom-programming project?	25	22
25.	Consider custom-programming by the in-house staff supplemented, if possible, by one or more program development tools.	—	—

Auerbach Table

Decision Table for Evaluating Software

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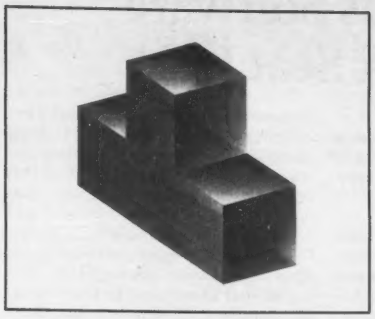
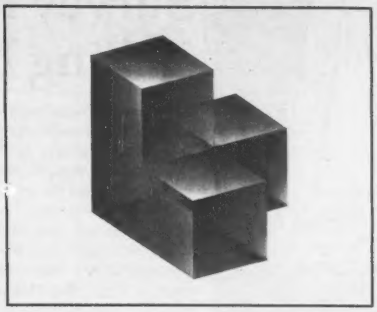
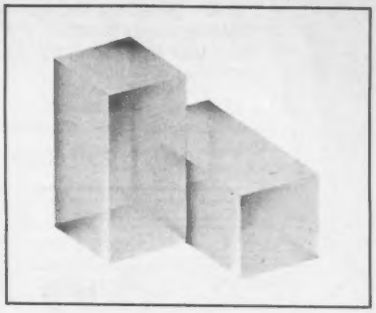
Multiple Systems Users

MVS/MVS-SP$_{1,2}$/MVS-SE/VS1/SVS/MVT/MFT







MSM™
Multiple Systems Manager

SUPER-MSI™
Multiple Systems Integrity Facility

GCD™
Global Console Director

UNIFIED DEVICE MANAGEMENT

The **Multiple Systems Manager** manages the allocation of TAPE and MOUNTABLE DISK devices across all systems in your complex. It allows you to operate normally with all devices ONLINE to all systems. MSM insures that device allocation by jobs in different systems occurs just as if all jobs were operating in one single unified system.

MSM eliminates the operational burden of juggling TAPE and DISK units among systems. It protects against the danger of a system accidently rewinding or overwriting a TAPE in use on another system; this removes the single greatest cause of shared tape mishaps.

MSM will use your TAPEs and DISKs more efficiently—which can result in immediate device cutbacks or (more likely) postponement of future acquisitions.

MSM is so transparent that it can be operated without the use of any new operational commands. Of course, there are powerful new commands available—however these are extras, not necessities.

Only MSM allows such truly NATURAL and transparent shared device management.

Other features (for MVS environments only): The MSM Device Preferencing capability allows devices to be dynamically structured into a hierarchy of sets; MSM insures that units in preferred sets are used, whereever possible, before less preferred sets.

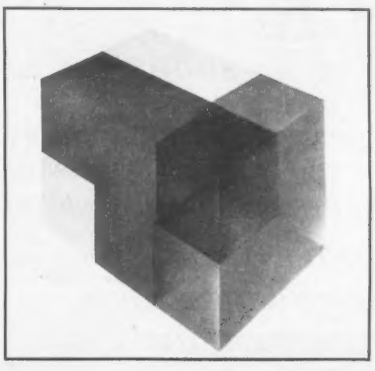
The MSM SOFTSWAP™ feature insures that DDR device SWAPs for TAPE units will NOT impact JOBs or TSO users which are not using tape allocation. Without SOFTSWAP™, TAPE DDR SWAPS are likely to impede all allocations in a system—including even those which do not use tape.

UNIFIED DATA INTEGRITY

The **Multiple Systems Integrity Facility** provides the same thorough dataset integrity protection for jobs in different systems that would exist if the jobs were in the same system. In addition to propagating "standard" dataset integrity across systems, Super-MSI also insures that the VSAM "internal" SHAREOPTIONS are honored throughout your entire complex. Effective cross-system VSAM integrity can be obtained in no other way than through the use of Super-MSI.

Another feature: Super-MSI also eliminates the hardware RESERVE lockouts which are normally inherent with SHARED DASD in multiple system environments.

Much more besides: Super-MSI has many other exciting features including special aids for operators and TSO Users. All in all, Super-MSI will be a very powerful addition to your installation.



UNIFIED OPERATOR CONSOLES

The **Global Console Director** is an extremely flexible tool. It allows (selected) message streams from different systems to be logically "blended" to create a unified system image (to whatever degree desired). In a slightly different vein, GCD allows any console on any system to be logically attached concurrently (and perhaps in different ways) to any set of systems in your complex! GCD allows commands entered from any console to be directed and processed anywhere in the complex; in this respect, all consoles are effectively linked to all systems. In almost every aspect, GCD is philosophically and operationally compatible with the standard system console support.

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Survey Finds Software Taking Back Seat Role

(Continued from SR/5)

software buyer should be aware that it will be necessary to report errors to the software supplier and that some provision must be available for correcting these errors.

The software procurement process was described in the report as a series of steps and guidelines that aid the user in obtaining the best combination of product, price and service.

The steps in the software procurement process were identified as establishing the goals of the procurement and identifying the person or persons who will make the final procurement decision. The next steps are to identify and prioritize the software requirements and to survey the market for available products and vendors.

Applying software selection guidelines to identify the kind of software (that is, custom, packaged or in-house) and its source follows. Next is development of detailed specifications for software. The user can then solicit vendors, evaluate vendor proposals and make a selection.

Cikoski emphasized the importance of initial planning regarding establishment of goals and requirements and knowing who will make the final decision. He cautioned users to be wary of computerization for its own sake. A manual system that is functioning well may not need to be computerized.

He suggested gauging certain factors, including whether current operating methods are providing poor service at high operating expense; a new application is being considered for which no operating methods exist; current equipment is obsolete and needs replacing; or major changes in organizational structure, staffing or budgeting are anticipated.

"The task of the decision maker is also to identify which (if any) of the local government's operating peculiarities are the result of the personal preferences of the administrative and clerical staff and which are truly unique operating requirements," Cikoski explained.

He suggested assigning priorities to software procurement on the basis of an anticipated three- to five-year system life. Users who are shopping for more than one software function were advised to rank the functions from most to least critical.

When several software functions are implemented, Cikoski noted, these should be installed in stages beginning with the most critical function. In this way, procurement can be a staged effort that could therefore take advantage of any advances in software technology.

The second part of this report, which details how to choose the most appropriate software package, is discussed on Page 6 in this report.

Additional reports on software acquisition and other articles from the *Computers in Local Government* series are available from Auerbach at 6560 N. Park Drive, Pennsauken, N.J. 08109.

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Puts Lid on Personnel Costs

Package Eases On-Line Development Crunch

FARMINGDALE, N.Y. — How do you proceed when you get the go-ahead to develop on-line applications, but receive a thumbs down on any staff increases?

Al Magnusson, DP director for White Rose Foods, Inc., managed to do it with the help of Central Software, a system development package from Planning Research Corp.

The independent food wholesaler serving more than 1,700 retail markets in the New York metropolitan area felt it would improve customer services by automating retail accounting functions with an on-line system.

"We wanted to get on-line, and we wanted to get on-line fast," Magnusson said. The intention was to develop an interactive retail accounting system with terminals and printers at customer sites. It was an "ambitious project" to increase the operating efficiency of both the retailers and the White Rose Foods wholesaling organization, according to a spokesman.

Principal Constraint

Magnusson's principal constraint was a limited programming staff. He got the go-ahead to develop the on-line applications, but was told he couldn't do it by increasing the programming staff or by hiring specialized talent.

"We considered a number of data management alternatives," he said, "but they all called for an increased human resources commitment." That was why the organization rejected the idea of developing the on-line applications with IBM's CICS command language.

"We have Cobol talent," Magnusson said. "We wanted to find an alternative that would make the most of the resources we already had on hand." So White Rose Foods began to investigate system development tools that might facilitate the development of the on-line applications it required.

The firm evaluated several system development packages from the standpoint of both current and future requirements. The selection process included a comprehensive cost/benefit analysis for each software package. Vendor support was also carefully scrutinized since it was considered an especially critical factor.

After a thorough preliminary evaluation, White Rose Foods personnel made site visits to the top-ranking vendors. Demonstrations and consultations with other users eventually narrowed the field to Planning Research Corp.'s Central Software package.

Trial Period

The software product was installed on a one-month trial basis with "immediately gratifying" results, Magnusson continued. By the end of the trial period, White Rose Foods had a number of on-line applications up and running.

"We were surprised at how simple it was to develop on-line applications with just Cobol talent," he recalled. "After a month of working with Central Software, we saw that it was by far the fastest and most economical way we could get on-line without a big, specialized in-house staff."

Magnusson and his staff had many of the system elements on-line within three months of Central Software's installation.

"With the systems development tool, we had everything we needed at our fingertips but the logic," he observed.

White Rose Foods' plan is to install CRTs and remote job entry printers in the offices of its retail accounts. Benefits are expected to accrue to both the wholesaler and its customers.

With the on-line system, users can inquire about the inventory status, determine the current wholesale prices of various products and calculate accounts payable to White Rose Foods.

Excess Capacity

And, since the wholesaler's DP center has excess capacity, it can provide many DP services to its customers. Customers also benefit by the ability to order products more efficiently because inventory control is improved with the new system, Magnusson said.

The benefits are impressive for White Rose Foods too, he reported. With the previous system, products could be in the warehouse for hours before they showed up on the inventory levels.

Now products are logged in as they come off the truck, and these on-line updates increase control.

Reduced paperwork, better record-keeping and improved management reporting are also among the system's benefits, according to Magnusson.

Running an IBM 370/138 and an

(Continued on SR/10)

If these two cars cost the same, which one would you buy?

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Dictionary Helps Identify, Manage Changes

MIAMI — Which is more important — a data base management system (DBMS) or the data dictionary with which the DBMS connects?

While DBMS are undoubtedly more glamorous, the utilitarian data dictionary is important, too, according to Jack Barnes, unit administrator for data base administration and distributed data processing at Metropolitan Dade (Metro Dade) County here.

"Without a data dictionary, you really haven't got a good handle on your data," Barnes maintained. "In fact, an organization needs a data administrator with a comprehensive view of the DP environment whether or not it has a data base administrator," he claimed.

Two recent Metro Dade experiences seem to justify Barnes' emphasis on a data dictionary. First, the organization converted from an SVS to an MVS operating system on both of its IBM 3032s. Intel Corp.'s integrated data dictionary (IDD) enabled the technicians to determine the potential impact of that change.

"We could identify the jobs in which we needed to change the JCL. We knew which job strings we had to pull and replace. Normally, you might forget about some jobs that are only used once or twice a year — but with the IDD reports, those didn't slip through," a spokesman noted.

More Evidence

Equally strong evidence came from an assignment that involved moving files from approximately 50 IBM disk packs to disk storage from Memorex Corp. "We would know that we were going to migrate a certain file from the IBM to the Memorex packs," Barnes said.

IDD helped determine which data bases were going to be affected and which programs ran against that file. "Then, we knew exactly where to change the file description," he said.

In both cases, it was the data dictionary that helped to identify and manage change, he observed.

"Essentially, Intel's IDD gives us control," Barnes said. "Besides managing the actual change, it enabled us to evaluate the impact on other programs before we implemented a modification. And, good change management can save DP a lot of headaches."

Data Base Operation

Good change management is also important for Metro Dade's high-volume production-oriented data base operation, he said.

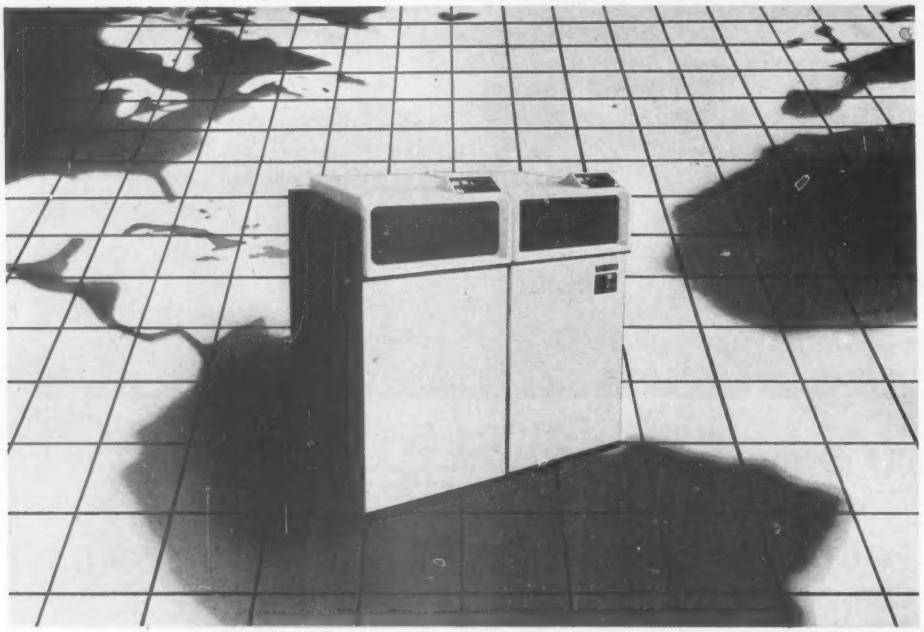
The environment includes two data bases storing more than 400 million characters with more than 3,000 transactions per hour running against the data bases in peak periods, Barnes continued.

And the operation reportedly requires these data bases to be on-line 24 hours each day throughout the entire week. The IDD helps control this environment by keeping track of the data base application programs being executed, a spokesman explained.

IDD can identify which jobs and/or procedures are accessing Intel's System 2000/80 DBMS. "It's a tie between the 'real world' and an accounting log," Barnes said. "If there is a problem we know exactly which user to [contact]," he said.

"Without a data dictionary, we would have had to recompile our 200-plus programs just to pull the information off when we changed the IBM packs over to Memorex," he said.

"Then, we would have manually gathered the results . . . and I'm sure we would have overlooked something in the procedure," the Metropolitan Dade County spokesman said.



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Package Eases On-Line Move

(Continued from SR/9)

IBM 360/40, the White Rose DP Center operates the interactive system under DOS/VS. A programming staff of four plus a five-person data entry group maintain the entire facility.

Based on his experience, DP Director Magnusson had some advice for companies considering a move to on-line processing: "If keeping a lid on personnel costs is as important [to other firms] as it was to us, I'd say that a systems development tool is the route that makes the most sense.

"It maximizes the productivity of your existing resources and keeps you firmly in control," the White Rose spokesman continued.

"We have been able to develop on-line applications that help us to be more responsive to our customers. And, we did it without increasing our programming staff."

He projected an eventual move to "a complete interactive system with no wasted effort, discarded hardware, or increase in staff" for White Rose Foods.

From Three Months to Three Weeks

System Shaves Months Off Development Time

SAN ANTONIO, Texas — A systems program has cut system development time from three months, using on-line Cobol, to three weeks for a toy distributor here.

The system has helped to eliminate programming specialists, allowing Lachman-Rose DP Director Joe Ramirez to recruit staff members who are programming generalists. According to Ramirez, using Insac Software, Inc.'s CPG systems program, an able programmer can be fully proficient in producing teleprocessing (TP) applications programs in a few weeks.

From the standpoint of productivity, he continued, CPG allows a small staff to provide faster programming response to the needs of each of the company's operating departments. "In terms of investment, the cost of CPG is easily justified through the gains in productivity," the DP director said.

Toy Business

From its Southwest headquarters, the firm represents major toy and hobby manufacturers and many specialty firms throughout the country.

"Our computer operation works 24 hours a day, five days a week between mid-September and Christmas in order to respond to the unique merchandising challenges of the toy and hobby distribution business," Ramirez continued.

The firm's computer operations must be gauged to meet immediate retailing demands, he said.

With a total DP staff of 13, including programmers, computer operators and data entry specialists, operations must be optimized to accommodate the peak season.

In order to do this, Lachman-Rose converted from its batch environment to an on-line system running on an IBM 370/135 under DOS/VS in 1978.

The first step in the upgrade involved going to an environment that provided both on-line and batch processing capabilities, he recalled. The transition meant converting nearly 1,450 Cobol and RPG programs.

Tool Selection

Next came the selection of an application development tool designed for on-line systems. Rather than purchase packages, the company had tended to develop nearly all of its applications software in-house.

"Our needs are so specialized, due to the characteristics of the toy business, that we cannot easily apply the typical software package to our system," Ramirez observed.

But, in late 1980, Lachman-Rose installed CPG, a product targeted toward TP application development.

"With CPG, which is now used exclusively to program all on-line systems, we have been able to more effectively utilize our small programming staff of three persons," Ramirez said.

"[It] enables our staff to work exclusively in an on-line environment. The only time we use RPG or Cobol is to update and maintain existing batch programs. And, in a time-sensitive business like ours, CPG literally cut the programming time for one new system from three months to three weeks."

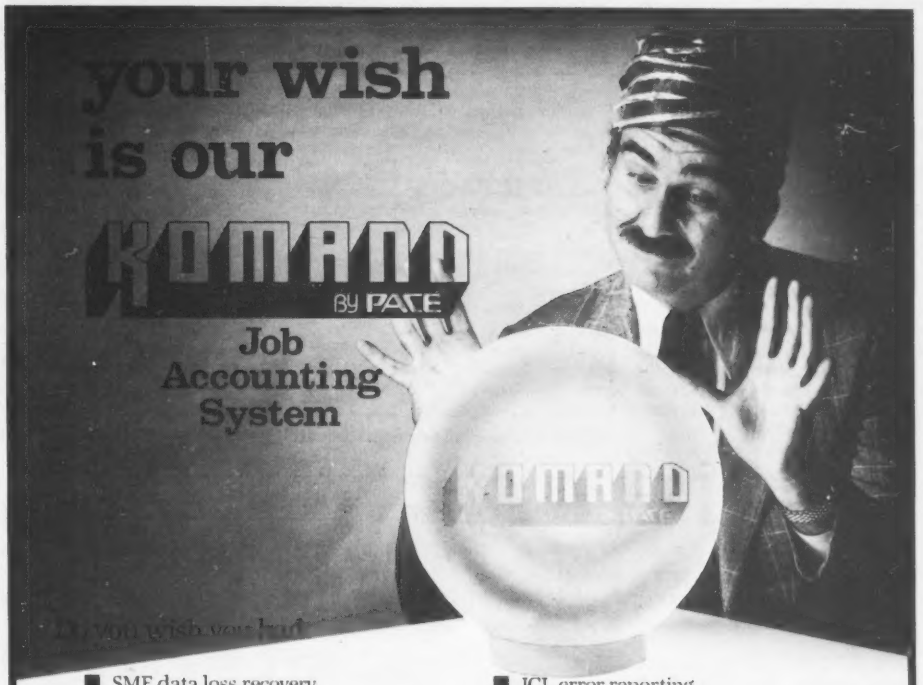
Changes, Updates

The package can also easily accommodate changes and updates in existing programs, he said. Program change requests from the warehouse or credit departments can now be handled in about half the time that it took with on-line Cobol, according to Ramirez. This factor alone makes CPG critical to the operation of the firm's small on-line system, he maintained.

'[It] enables our staff to work exclusively in an on-line environment. The only time we use RPG or Cobol is to update and maintain existing batch programs. And, in a time sensitive business like ours, CPG literally cut the programming time for one new system from three months to three weeks.'

The current system includes 13 terminals located in key business centers like the sales, warehouse, credit and DP departments with additional terminals planned for the accounting department.

CPG also provides specialized assignments like buffering, file handling, screen mapping, storage optimization and addressing besides handling all Lachman-Rose TP activities, Ramirez said.



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Vendor Shifts Predicted in Software Mart

By Rita Shoor
CW Staff

FRAMINGHAM, Mass. — Hardware vendors have historically dominated the systems software marketplace. That picture may change in some product areas by 1984, according to the *Independent Packaged Software Reference Book* from International Data Corp. (IDC) here.

Developing systems software requires thorough knowledge of hardware, and it is logically the hardware vendors that possess this kind of expertise, IDC said. It is the most fundamental software required to operate the machines and involves "highly intricate interaction among many functions."

But hardware vendors are primarily interested in selling hardware, the report said, and "often lack the motivation to develop the most efficient system." That leaves the field open for the independent system software vendors to move in in some product areas, notably communications. Revenues from this market are predicted to almost triple by 1984 to account for 29% of all system software revenues (see Figure 1).

The market research firm defined communications software as packages designed "to provide terminal access and monitoring functions to handle data entry and delivery in the teleprocessing on-line environment." Also included in the report's systems software category are:

- Operating systems — the basic software monitors necessary to run the hardware plus associated support programs to access systems resources and peripherals.
- Compilers and assemblers — language processors that translate programs into machine-readable language for processing.
- Performance measurement packages designed to identify current and potential problem areas in machine throughput, including routines to monitor and evaluate system resource utilization, measure and analyze job performance and simulate program and system design in various DP environments.
- System resource management products to increase system performance and efficiency by optimizing system resource utilization. Tape library and inventory control packages, disk space managers and system managers, including operating system enhancements and job schedulers, fall into this category.

Seven suppliers account for approximately 50% of the revenue in the systems software market, according to IDC. Computer Associates, Inc. and Insac Software, Inc. (which acquired Altergo Software, Inc.) are the relative newcomers to this group, with their respective market shares of 6% and 5%. The other five vendors in this market, along with particular areas of expertise, are shown in Figure 2.

While IDC described growth in the systems software market as "modest" (see Figure 3), the firm still predicted an increase from $126 million in 1979 to $294 million in 1984 for this sector.

Independents will find continued opportunities because increasing user demand for packages that improve management of system resources and that reduce costs continues to expand this market, the report noted. IDC maintained that "any systems package that speeds up machine throughput and optimizes terminal/tape/memory usage will be in demand."

Growing user sophistication is another trend expected to affect the systems software market. Since fewer users are willing to accept inefficient packages from hardware manufacturers, user acceptance of independent packaged software is increasing, according to IDC.

The market research firm also predicted that minicomputers would be a growth area because "there is a need for good packages to target the expanding [mini] user base."

In addition, distributed processing will continue to be a significant factor affecting the systems software market, according to the study, particularly in terms of performance measurement tools, system resource management packages and communications software.

The Independent Packaged Software Reference Book is available from IDC for $2,500. IDC is at 5 Speen St., Box 1450, Framingham, Mass. 01701.

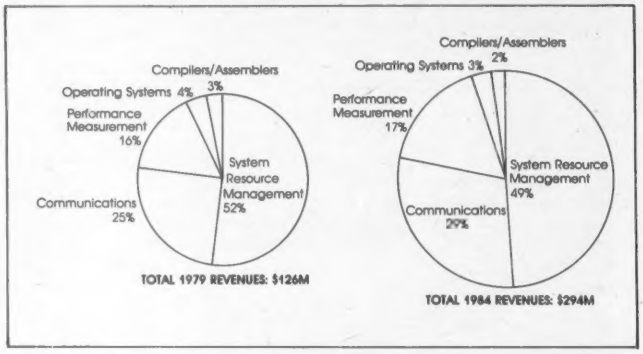

Figure 1. Changing Segmentation of Systems Software Market, 1979-1984

Vendor	1979 Revenues	% Share	Type of Software Offered
SDI	$19	15%	System Resource Management
Boole & Babbage	12	9%	Performance Measurement, System Resource Management
Computer Associates, Inc.	7	6%	System Resource Management
Altergo Software, Inc.	6.5	5%	Communications, System Resource Management
University Computing Company	6	5%	System Resource Management
Cincom Systems, Inc.	5	4%	Communications
The Computer Software Company	5	4%	Operating System
Others	65.5	52%	
TOTAL	$126	100%	

Figure 2. Packaged Software Suppliers' 1979 Market Shares: Systems Software (In Millions of Dollars)

	1978	$ Δ	1979	$ Δ	1980	$ Δ	1981	$ Δ	1982	$ Δ	1983	$ Δ	1984
Operating Systems	4.6	13%	5.2	12%	5.8	12%	6.5	12%	7.3	16%	8.5	16%	9.9
Compilers/Assemblers	3.4	12%	3.8	11%	4.2	10%	4.6	9%	5.0	10%	5.5	9%	6.0
Performance Measurement	16.3	24%	20.2	22%	24.7	19%	29.4	17%	34.4	17%	40.4	16%	47.1
Communications	25.2	25%	31.4	24%	38.8	22%	47.2	22%	57.6	22%	70.6	22%	86.5
System Resource Management	54.5	20%	65.4	19%	77.5	17%	90.3	16%	104.7	17%	123.0	17%	144.5
TOTAL	104.0	21%	126.0	20%	151.0	18%	178.0	17%	209.0	19%	248.0	19%	294.0

IDC Charts

Figure 3. Packaged Systems Software Market Size and Growth, 1978-1984 (In Millions of Dollars)

IDC Predicts Sector Growth of 29%

Utility Mart Seen Hitting $1.2 Billion by '84

By Rita Shoor
CW Staff

FRAMINGHAM, Mass. — Revenues in the utility software market are expected to reach almost $1.2 billion by 1984, based on the *Independent Packaged Software Reference Book* from International Data Corp. (IDC) here.

Hardware manufacturers hold sway over just a few sectors in this market area, notably in copy/dump and sort/merge software packages, IDC said. This is in contrast to the historical dominance of hardware vendors in the systems software sector (see story on Special Report/12).

And, while data management products will account for nearly 50% of all utility software revenues by 1984, it is report generators and job accounting packages that will experience the most significant growth, the report said (see Figure 1).

IDC divided the utility software market into seven main sectors:

• Programming design tools — perform applications tasks that aid the programmer in the coding process. These include program preprocessors and optimizers, data and/or program generators, program documentation generators, program editors and debuggers and subroutines and procedures common to a majority of programs.

• Program support and security packages — maintain and protect data and programs and control user access to the system. Copy/dump/restore packages, data/file protection packages, security and access control packages and program librarians that offer security features are included in this sector.

• Conversion aids and cross-assemblers — allow faster change implementation in the DP environment. Program translators, cross-assemblers that generate machine-readable code on one system to be run on another system, make up this package group.

• Sort/merge packages — reorganize data.

• Data management products — manipulate and organize data within the system. These include data managers for individual data sets, file managers to control data files, data base management systems and data dictionaries.

• Report generation packages — provide inquiry, retrieval and presentation of information.

• Job accounting systems — track machine usage by individual units and/
or users and bill users for that usage.

This market is continuing to expand, and IDC projected that revenues from the utility software sector will increase by approximately 29% compounded through 1984 (see Figure 2).

'While data management products will account for nearly 50% of all utility software revenues by 1984, it is report generators and job accounting packages that will experience the most significant growth.'

Growing user awareness of the need to control costs in the DP environment will be one factor in that growth, IDC noted. The market research firm predicted a strong potential for program design, support, conversion and data management products that increase programmer productivity and for job accounting packages that help control system operation costs.

Packages targeting the ultimate end user will also be in high demand, according to the study. Report generators and data management products are particularly affected by this trend, IDC observed, and some vendors already offer relatively easy-to-use programming languages that enable the end user to develop his own application.

Distributed processing will increasingly affect utility software, since this trend continues to generate demand for packages that operate in a multiuser, on-line environment, the report continued.

IDC also projected opportunities for independent software suppliers to extend existing packages in order to provide users with an "integrated system" of related functions. This is especially evident in the data management, report generation and security submarkets, according to the report.

Reasons for Submarkets

One reason for the opportunities in these submarkets is that increasing data base management system implementations require information retrieval capabilities in order to get the fullest use of the system.

Another is that expanding end user involvement increases the number of people accessing a system and creates problems associated with data integrity and security, the market research firm said.

The report, which details the application software market as well as the systems and utilities software sectors, costs $2,500 from IDC at 5 Speen St., Box 1450, Framingham, Mass. 01701.

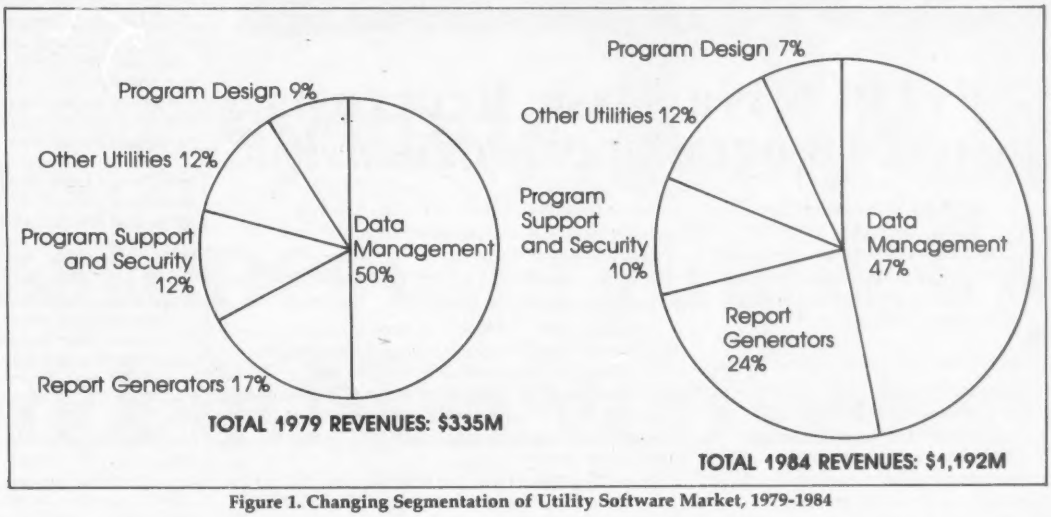

Figure 1. Changing Segmentation of Utility Software Market, 1979-1984

	1978	$ Δ	1979	$ Δ	1980	$ Δ	1981	$ Δ	1982	$ Δ	1983	$ Δ	1984
Program Design	25.0	24%	31.0	22%	37.9	21%	45.9	21%	55.5	20%	66.8	20%	80.3
Program Support & Security	31.2	29%	40.1	27%	51.0	25%	63.7	24%	79.0	23%	97.2	23%	120.0
Conversion Aids	3.5	17%	4.1	17%	4.8	15%	5.5	15%	6.3	13%	7.1	13%	8.0
Sort/Merge	13.5	33%	17.9	31%	23.4	28%	29.9	26%	37.6	24%	46.6	23%	57.5
Data Management	128.2	31%	167.4	28%	215.0	28%	275.2	27%	349.5	28%	445.8	27%	564.2
Report Generators	35.0	66%	58.0	55%	89.9	45%	130.8	35%	176.0	30%	228.5	27%	291.0
Job Accounting	11.6	42%	16.5	39%	23.0	35%	31.0	33%	41.1	31%	54.0	31%	71.0
TOTAL	248.0	35%	335.0	33%	445.0	31%	582.0	28%	745.0	27%	946.0	26%	1,192.0

IDC Charts

Figure 2. Packaged Utility Software Market Size and Growth, 1978-1984 (In Millions of Dollars)

Need to Control Data Access

Xerox Canada Seeks, Finds Data Security Aid

TORONTO — When Xerox Canada, Inc. here decided that conventional security measures were not enough to protect its data bases, the search was on for a security software package. While IBM's RACF was in contention, ACF2, developed by Illinois-based Schrager, Klemens and Krueger (SSK) was the final selection, according to Peter Harding, systems consultant.

Faced in the late '70s with a gradual migration toward data base technology and the need for end-user access to information stored on the computer, Xerox Canada recognized the need to improve data access control of its IBM MVS environment. Conventional security measures like password protection on files and the standard security provided within the IMS data base management system (DBMS) on-line environment no longer met Xerox's established corporate security policies, the spokesman said.

The Information Services Department embarked on a project to bring Xerox Canada into compliance with the corporate policy in April of 1979, he recalled. The selection of resource access control software was a major endeavor in this project and two security software packages were evaluated, he said.

These were IBM's RACF and the SKK-developed ACF2, currently marketed by the Cambridge Systems Group. Both packages were scored on a predefined set of requirements addressing security, auditability and control. In July 1979, Xerox Canada opted to purchase ACF2.

"There were many factors in our decision to purchase ACF2," according to Harding, who managed the software's installation and implementation at Xerox Canada's head office here.

"The two most important were its basic design philosophy and the fact [that] it was a complete security and audit package," he said. That design philosophy is to protect by default so that one must take positive action to allow the sharing of a resource. If there is no action, there will be no access, a spokesman explained.

"ACF2 met all of our critical requirements. We did not require any extra programs or user exits to meet our needs; the package provides security as well as a comprehensive audit trail and reporting [software]," the consultant noted.

The security package was initially installed within a two-week period in September 1979, he said. "We were a beta test site for the IMS on-line transaction support feature of ACF2. Even with solving a few remaining problems with the feature, the installation went smoothly and effortlessly. Now we can install a new release of ACF2 within a week," he claimed.

Implementation Phases

Implementation occurred in two phases: "The first phase gave us access control of all IMS on-line transactions, while the second phase brought data set access control via batch jobs or TSO under the umbrella of ACF2," Harding said.

The IMS on-line implementation was accomplished very quickly since the whole on-line environment was new with the conversion to IMS. Security procedures were incorporated into the new operating procedures and the end users could accept them as easily as the rest of the procedures in the new environment, he said.

Harding decided that the data set access control implementation should be done "slowly and deliberately" to minimize user impact.

"Implementing access control over our data required the modification of a number of established policies and procedures as well as the creation of a few new ones. I felt this should be done over an extended period of time to minimize the impact of change and to maximize the acceptance of ACF2," he said.

The progression from quiet mode to abort mode occurred over a two-month period, but several months of prior analysis was necessary in order to develop the policies and procedures and to educate the users, he said.

Functionally, ACF2 utilizes two types of information, Logonid and Rules, a representative explained. The Logonid contains both vendor-supplied and installation-defined information relating to the individual requiring access to the computer system, while Rules defines the access to particular computer resources, he said.

At job or session initiation, ACF2 stores certain information from the

(Continued on SR/18)

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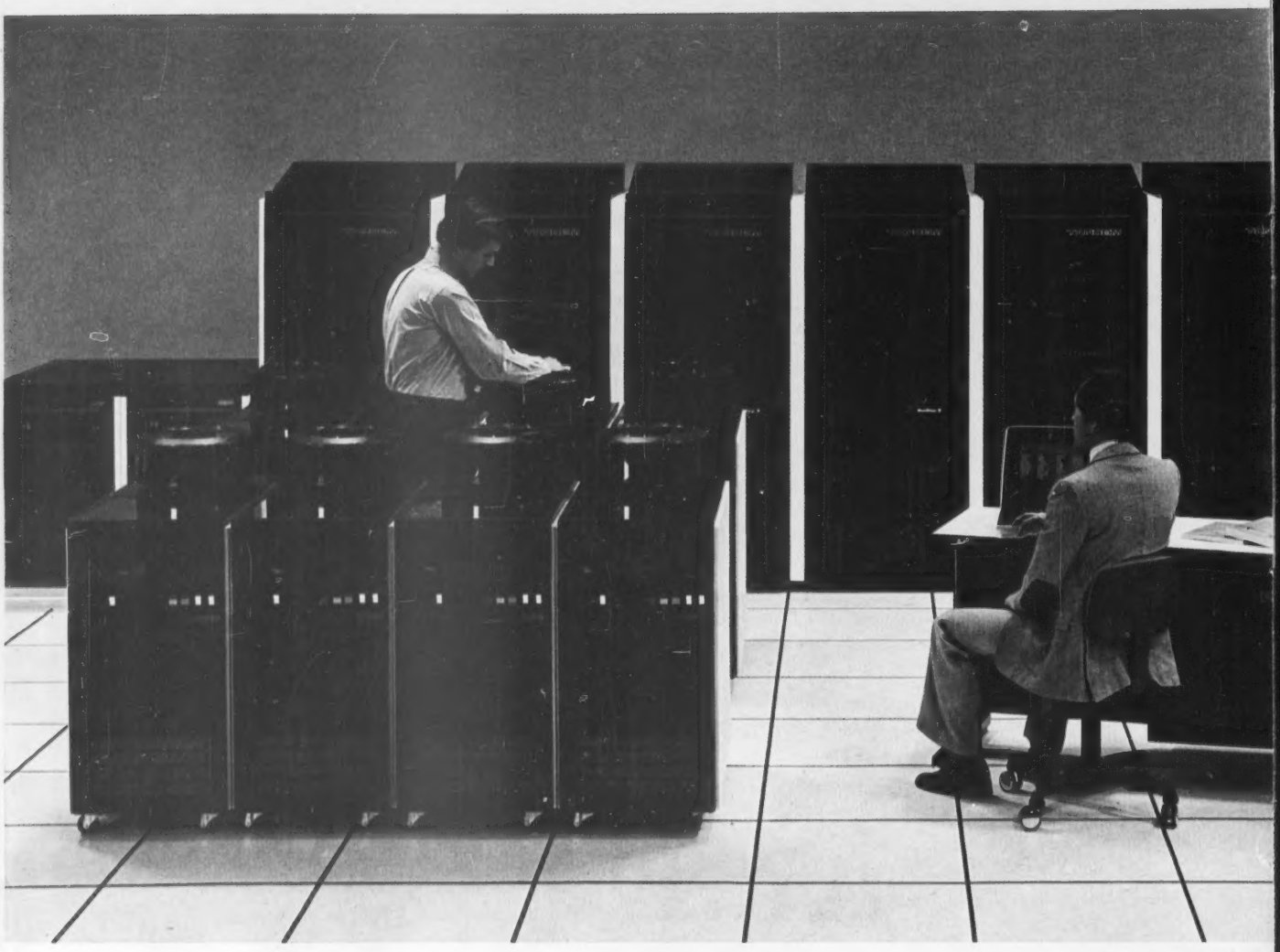

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Service Bureau Monitors Dasd Response Time

ONTARIO — As a service bureau, Datacrown Time-Sharing Co. here found it necessary to constantly monitor its direct-access storage device (Dasd) environment for volume and data set contention problems in order to provide acceptable on-line response time for its users.

The company has customers in the U.S. and Canada. It has an MVS environment and, in Toronto, has five attached processors — three IBM 370/168s, one IBM 3033 and one 3031.

In Ottowa, there are two 3033 mainframes and one 370/168.

There are approximately 450 spindles at the Toronto site alone, a company spokesman said. The Dasd is shared among as many as five of the CPU's, the spokesman continued, noting that managing 450 spindles is a difficult, if not impossible, task without the proper tools.

Datacrown selected Software Corp. of America's Disk Pack Reorganizer (Dpro) as a tool to keep its Dasd optimized. Dpro reportedly was selected after the company evaluated several other packages, including Boole & Babbage, Inc.'s Data Set Optimizer.

Dpro was designed to collect and analyze information on seek times and activity and to recommend the ideal data set placement. With 450 spindles of Dasd, Datacrown needed information to make decisions on data set and volume reorganization to solve contention problems, the spokesman said.

Problems Avoided

Some of the company's system packs are shared among all five CPU's, which could cause performance problems if critical files were not on the right volume or the right place on the volume, the spokesman explained.

Dpro reportedly provides the company with the information to make decisions and also recommends the reorganization of data sets to assist in physically moving the files around.

The product is helping Datacrown keep its Dasd optimized, and it is used in performance analysis and problem solving, the spokesman said. Two company groups that use Dpro on a regular basis are the Dasd Management Group and the Performance Group.

The Management Group runs Dpro about once a week on the internal systems packs and uses it to arrange the most active data sets among packs, the spokesman said. After following through with the Dpro recommended reorganization, the group runs Dpro again to establish that the projected improvement was realized.

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Aid Controls Data Access

(Continued from SR/14)

Logonid. This user identification (UID) string — comprised of installation-defined fields plus the Logonid — is stored for the duration of the job or session, he explained. When someone accesses a computer resource, ACF2 checks the stored UID string against those in the Rules to see if access should be allowed.

But access security can go farther than this, the spokesman continued. IMS transaction access rules, for example, include the ability to indicate from which terminal(s) the access can originate as well as an expiration date for that access, he said.

Password Option

There is also an option for reverification of the terminal operator's password — a useful facility for highly sensitive transactions, he observed.

And the environment can be defined even more specifically for data set access, he said, with program and program library, job source, an expiration date and the applicable data definition OCL statement name.

"The day-to-day administration of ACF2 has taken less time than previously planned," Harding noted. "Daily maintenance of the Rules and Logonids, as well as the follow-up on violations, takes one person approximately one-half day. This will decrease even further once some of the manual work load is automated," he predicted.

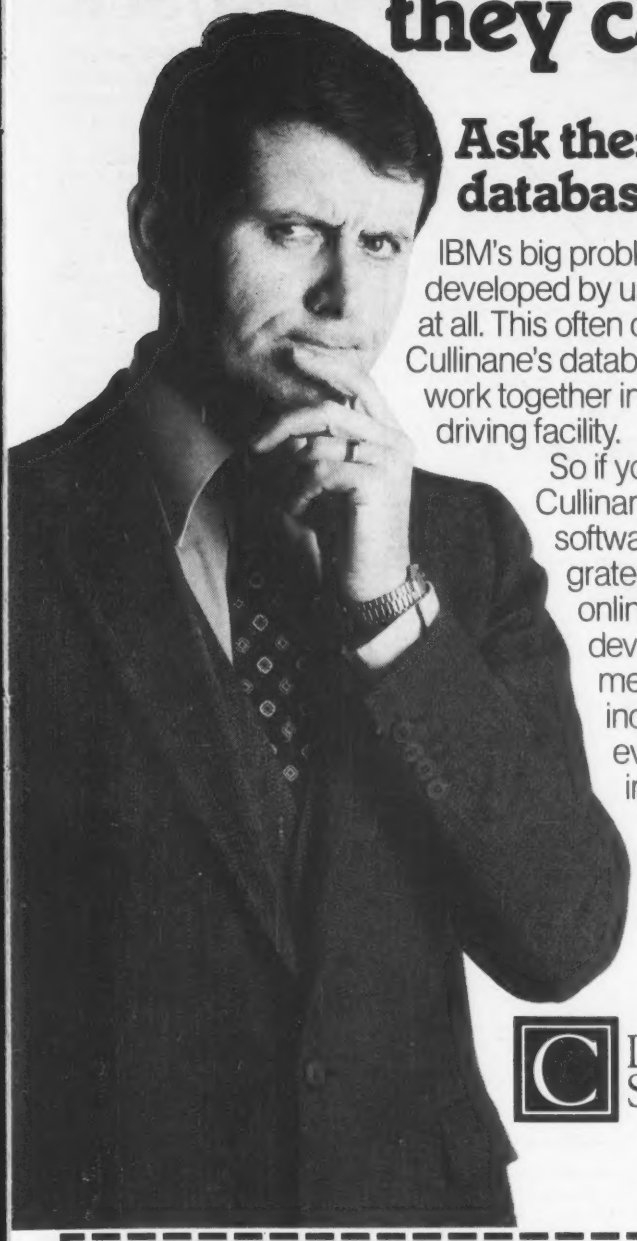
'Pattern Masking'

This minimization of administrative overhead is possible through "pattern masking" that reportedly enables one rule to be written to allow a group of job-related people to have access to a related resources group.

One Xerox Canada concern was the degree of vendor support it could expect to receive with ACF2. "But this is no longer a concern," Harding said. "SKK's responsiveness to our problems has been prompt," he noted.

ACF2 is meeting all of Xerox Canada's security, control and auditability requirements on an Amdahl Corp. V/6 mainframe, he said.

Want to ask IBM a database question they can't answer?



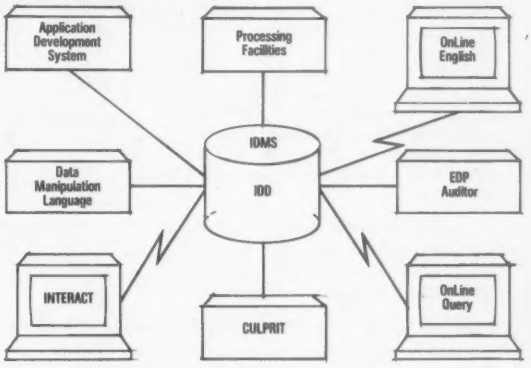
Ask them to explain to you how their database software works together.

IBM's big problem is that most of their database software was developed by users. As a result, it doesn't work well together, if at all. This often comes as a big surprise to top management. Cullinane's database software was designed and developed to work together in an elegant way with the data dictionary as the driving facility.

So if you are considering IBM database software vs. Cullinane's, ask IBM to show you how their database software works together, particularly with an integrated data dictionary, and yes, also include an online query, a report generator, an application development system and an online program development facility. When it becomes obvious to everyone, including your Vice President of Finance (or whoever signs the contract), that Cullinane has this integration and IBM doesn't, he will approve your recommendation to acquire IDMS.

Then call us with the good news!

Database Systems



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Terminal Response Time Compared

Study Pits IBM's TSO/SPF Against VAM/SPF

SUNNYVALE, Calif. — Boole & Babbage here claimed it cut terminal response time from 11.7 seconds to 2.54 seconds with its Vtam Application Monitor (VAM) for users of IBM's Structured Programming Facility (SPF). Results were based on a recent benchmark study performed by Boole & Babbage comparing VAM/SPF performance with SPF response time under IBM's Time Sharing Option (TSO).

Providing acceptable service levels to all users while operating within the constraints of a budget is a constant problem for information systems managers. This problem is especially apparent in an interactive environment where these managers "feel an almost constant pressure to improve response time or increase the maximum number of users," a Boole & Babbage spokesman said.

IBM's SPF, reportedly designed to address the needs of interactive users, actually introduces a situation in which its productivity gains are offset by the resources required to support it under TSO, he claimed.

Boole & Babbage developed what it felt was a solution to this problem with VAM/SPF, he said, but a validation of actual throughput and response improvements that extended to both an SPF user group and to the behavior of the entire system when VAM was introduced into it was deemed necessary.

A benchmark representing a typical production TSO environment was designed to test for areas of productivity improvement provided by VAM/SPF. The product's response times had to be compared with those offered by TSO/SPF. Second, overall system utilization had to be gauged by the total number of transactions processed within a specified time frame. Finally, the validation of an increase in the number of concurrent SPF users was necessary.

Response Time

Terminal response time with 48 simulated users went from 11.7 seconds under TSO/SPF to 2.54 seconds under VAM/SPF, according to the benchmark. When the same test was run with 24 simulated users, there was a 281% improvement with the TSO/SPF response of 3.75 seconds being cut to .5 seconds under VAM/SPF (see Figure 1).

Again with 48 simulated users, the total number of transactions processed within a 10-minute time period assuming 10 seconds of "think time" between each transaction was 1,200 for TSO/SPF and 1,860 for VAM/SPF (see Figure 2).

Benchmark results also pointed to a reduction in overall system swapping, the spokesman said. The total paging rate decreased from 80 page/sec under TSO to 30 under VAM with 24 simulated users and from 104 page/sec to 55 page/sec for the same two products with 48 simulated users. That translated to a 62.5% decrease in the first test and a 47.1% decrease for the larger user group, Boole & Babbage said (see Figure 3).

These results seem to indicate both a significant improvement in response times and a substantial increase in the number of transactions processed. However, the company was reluctant to quantify the potential increase in the number of concurrent users, since response time and total resources consumed by VAM/SPF were consistently lower than TSO/SPF during the study. The spokesman noted that actual performance levels achievable within any given production environment are "anticipated to vary" and further acknowledged "no absolute claim for improvement levels is implied."

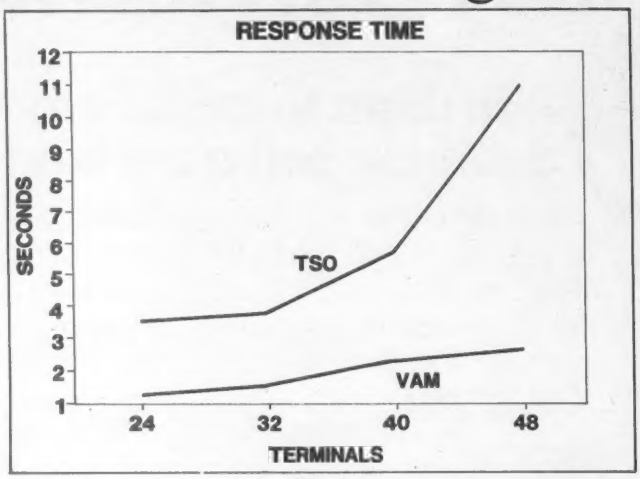

Figure 1

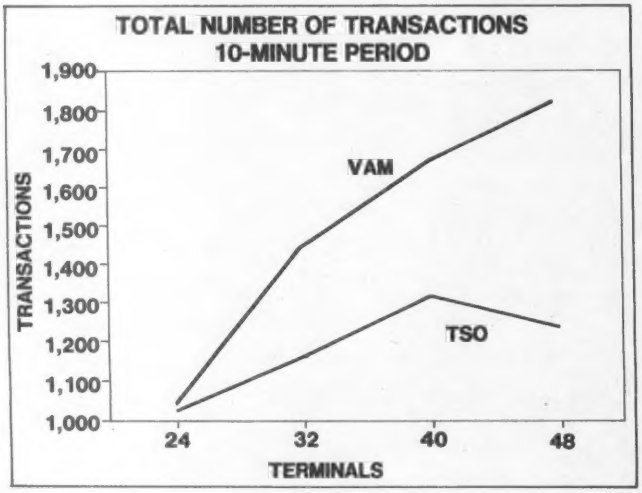

Figure 2

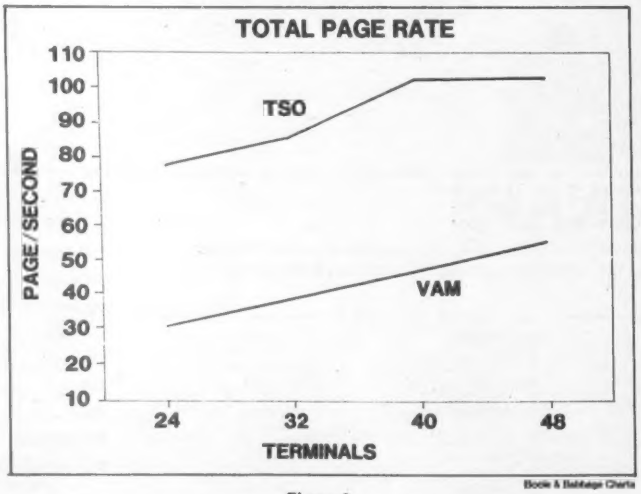

Figure 3

The benchmark was performed on an IBM 3032 CPU running MVS Release 3.7, System Extension (SE). Vtam2 and SPF 2.2 were used in both tests, he said. The system had 6M bytes of real storage and used two block multiplexer channels with 3330 Model 1 disk packs and was thus both memory- and I/O-constrained to a certain extent, he said. However, while smaller in scale, this constraint was found to be indicative of most installations, he claimed.

A controlled generation of message traffic was produced by running IBM's Teleprocessing Network Simulator (TPNS) on a separate 3033 to simulate varying numbers of typical SPF user sessions, he said.

Since the study was done with IBM's SE/1 and "IBM estimates that SE/1 gives a 14% to 17% performance improvement over native MVS," Boole & Babbage felt that the benchmark figures for VAM/SPF running in a non-SE/1 environment might have shown an even more significant performance increase, he continued.

VAM/SPF may also benefit from the storage isolation facility in SE/II since it will be possible to reserve real storage frames for VAM/SPF, he speculated.

Testing Procedures

The sole reason for benchmark testing of any new or newly revised product is to verify that it meets the design specifications, he maintained. Boole & Babbage thus attempted to establish testing procedures that allowed "a fair comparison to be made between the performances of SPF under VAM and under TSO."

Benchmark testing procedures for VAM/SPF and TSO/SPF were identical, according to the firm. The same hardware, batch and on-line configurations were used with relevant performance data being collected during four 10-minute runs by Boole & Babbage's Comprehensive Management Facility (CMF), IBM's Resource Measurement Facility (RMF) and TPNS.

Separate measurement sessions for VAM/SPF and TSO/SPF were conducted. The initial on-line configuration simulation for both products included three lines with eight users per line for a total of 24 simulated users with CMF, RMF and TPNS gathering performance data during the runs. At the end of each 10-minute run, a line with an additional eight simulated users was added and data was accumulated for another 10 minutes. This process was then repeated, ending with six lines and 48 simulated users, the spokesman said.

At the completion of testing, all recorded data for both VAM/SPF and TSO/SPF was assembled for an analysis that lasted almost a month. This analysis included cross-checking to ensure that "all figures and comparisons between VAM/SPF and TSO/SPF are accurate and valid."

Librarian Helps Teach Programming Students

BIRMINGHAM, Ala. — IBM compatibility and cost-effectiveness were the deciding factors in Herzing Institute's purchase of a librarian package.

An on-line librarian system was installed in June 1980 to supplement the work of some 140 programming students and 30 would-be computer operators at the business school, according to Earl Cooper, director of DP. This instructional usage required a system that was "easy to teach and easy to operate," he said.

Cooper had other criteria besides simplicity in mind when surveying the available library systems. He needed a package that offered compatibility with an IBM 360 mainframe, Model 3277 terminals and 2311 disk drives. Herzing also required 370 compatibility because of plans for eventual upgrading, he said.

The school needed the most cost-effective system on the market, according to Don Lewis, director of the institute, and the cost of Computer Software Unlimited's (CSU) Marian was "well below the competition."

Additional Savings

The package also offered additional savings after implementation and enabled Herzing to bypass the purchase of an $18,000 heavy-duty card reader, he said.

The $7,500 Marian package consisting of the on-line librarian, a teleprocessing (TP) monitor known as Harold and the Marian Spooling System (MSS) was installed in June 1980. After extended use, the system has provided the productivity, performance, security and simplicity that Herzing deemed essential, both Cooper and Lewis reported.

Students learn CRT terminal and library use simultaneously in "eight to 12 hours of class time," according to Cooper. They can modify programs after this with "minimum effort" — and the help of the readable user's manual, he said.

Marian has also provided savings in terms of both money and disk storage space, he continued. The software currently allows nearly 400 programs to be stored on 50% of an IBM 2311 disk pack. So Cooper has reserved only one 2311 for the entire system.

The TP monitor also allows Cooper to monitor a student's work and programming history. This leads to savings in card costs, downtime and data entry, he said.

Good retrieval speed, audit-trail generation and a date function were cited as offering significant performance advantages. "Marian can recreate prior programs more easily than other systems because it is date controlled," he explained. This feature allows Cooper to keep track of when student-implemented modifications occur.

Software Security

Software security is especially important to the students, according to Cooper. Each one has an individual access code, which means that no one except the instructor with the master code can look at a student's work, he said.

Herzing currently runs the Marian system in a configuration that includes a 56K-byte Model 360 and 12 CRT terminals.

Future plans call for the institute adding some 20 CRT terminals, upgrading to a 370 mainframe and offering service at remote sites, a spokesman noted.

The system's TP monitor works with Marian as well as user-developed applications in Herzing's software setup, according to Mike Pfaff, CSU president. The combination of Harold, the Marian system and a typical user application occupy a 50K-byte foreground partition in this environment, he said.

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COMPUTERWORLD

Using 'Contradictory Product'

Switch to Application Aid Speeds Productivity

LOS ANGELES — After Arden-Mayfair, Inc. here switched from batch to on-line processing, Systems and Programming Manager Cecil Rose expected to be able to show the advantages immediately to upper management with a demonstration using the Display Management System (DMS), IBM's CICS application development aid.

A month and a half later, and already several weeks behind schedule with his premier system, Rose said, "DMS is a contradictory product. It may be a tool for building on-line systems, but it is itself a batch system."

"Despite our new on-line capabilities, we were still assembling and link-editing programs in the batch mode with DMS," he said, adding, "DMS design flaws and inefficient coding made response time on the order of 15 to 20 seconds on one critical screen, and we found ourselves spending more time trying to get DMS to work the way we wanted than we spent putting together systems for our users."

A screen could be developed using DMS in about half a day, Rose explained, but in certain critical applications the revisions and updates caused real difficulties. "It seemed we were always forced to work around DMS system design problems, sometimes resorting to programming tricks just to get its response time to an acceptable one or two seconds," he said.

It was sometimes taking as long as a couple of weeks to develop a screen. "Unless a programmer employed special programming and lots of extra work, he could update only one record per screen; with the extra work, he could update four," Rose added.

Demonstration Sites

Arden-Mayfair is a $400 million chain of 100 grocery stores in six western states. Rose selected a wholly owned subsidiary of seven Gelson's gourmet stores for the demonstration of the system. "Gelson's did not have any computer capabilities until this summer when we gave them two terminals and a printer to hook up their general offices to our IBM 370/145," he said.

Rose's staff used DMS to create five master files to contain grocery items, vendors, prices, store information and purchase orders. Since liquor and wine sales are a large part of Gelson's business, they decided to begin creating an on-line order entry and order update system for the corporate liquor and wine buyer.

Initially, a 10-screen inquiry system was planned to enable the buyer to access the five master files. The goal, according to Rose, was to have the entire system designed and implemented, with all the necessary file maintenance screens, within a month.

"By the time I was three weeks overdue with my demo project, we had the initial 10 screens, but no file maintenance screens. And when I saw how long it took us to develop what I consider a very modest inquiry system using DMS, I decided to look at other CICS application products before becoming too heavily committed to DMS," Rose explained.

After looking at three possible alternatives, he decided upon UFO from Oxford Software as a replacement for DMS.

"My main objection to DMS is its inherent design deficiencies," Rose explained. "As a DOS/VS shop using DMS, all our link-edits had to be done in the batch mode in a background partition of our machine," he continued, noting that this caused delays ranging from 10 minutes to several hours when changing screens.

"UFO, on the other hand, has parameters which allow us to change a screen in the file instead of in core, so screen edits can execute on-line in seconds without going through compiles," Rose said. A further advantage is that it reportedly enables the user to see the results of a design immediately. With DMS, Rose said, it can take up to several hours to get program compiles and find out if a change is going to work or not.

"We found that with DMS we were much more conservative with our changes because they took so long to make. With UFO, changes are much easier and faster," he said. Rose's staff is able to experiment more and, as a result, to produce better systems, he said. One or two dozen UFO screen changes can be made in the time it used to take to make one DMS screen change.

"When a programmer executes a UFO transaction, he is essentially playing operator, changing screen definitions and executing them immediately," he explained. "UFO's multirecord update on a browse will increase operator productivity by five to 10 times, allowing him to review and change 20 records per screen as opposed to DMS' maximum of four."

(Continued on SR/24)

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DEC OEM Reorients Systems Software,

MICHIGAN CITY, Ind. — From Midwest Data Systems' experience, systems and utility software packages are geared toward the programmer and not the end user.

Utilities such as sorts, screen generators and report generators are executed by means of either a mass of JCL, which is meaningless to a nontechnical user, or a group of statements within a program, which usually is inaccessible to the user.

These packages have been brought into the limelight recently at Midwest Data, a service bureau using IBM 3031s with CICS. The company has been in the usual DP crunch. Each day brings more user requests for new reports and on-line capabilities, a spokesman said.

Sometimes the new reports amount to merely resorting the input file into a different sequence and running it through the same print program after having made a few changes to print subtotals on the new control break (sort key). Usually, the new screens requested are used for inquiry or update to an existing file, the firm said.

Busy Staff

These projects, along with a certain number of new programs and system development, are enough to keep a large staff of analysts/programmers busy.

Until a few months ago, when Midwest Data became an OEM for Digital Equipment Corp., this was the working environment. Management assigned two programmers to software development and maintenance on the company's line of DEC

Aid Switch Cuts Time

(Continued from SR/22)

Before purchasing UFO, Arden-Mayfair brought the system in-house for a 30-day trial in October. Within those 30 days, Rose was able to duplicate the DMS demo system. "While UFO was immeasurably easier to use than DMS, I really can't offer a strict time comparison because I obviously went through a learning curve with DMS," he explained.

He did not duplicate the functions of the DMS system screen by screen, but was able to do in one UFO screen what DMS took three or four screens to accomplish.

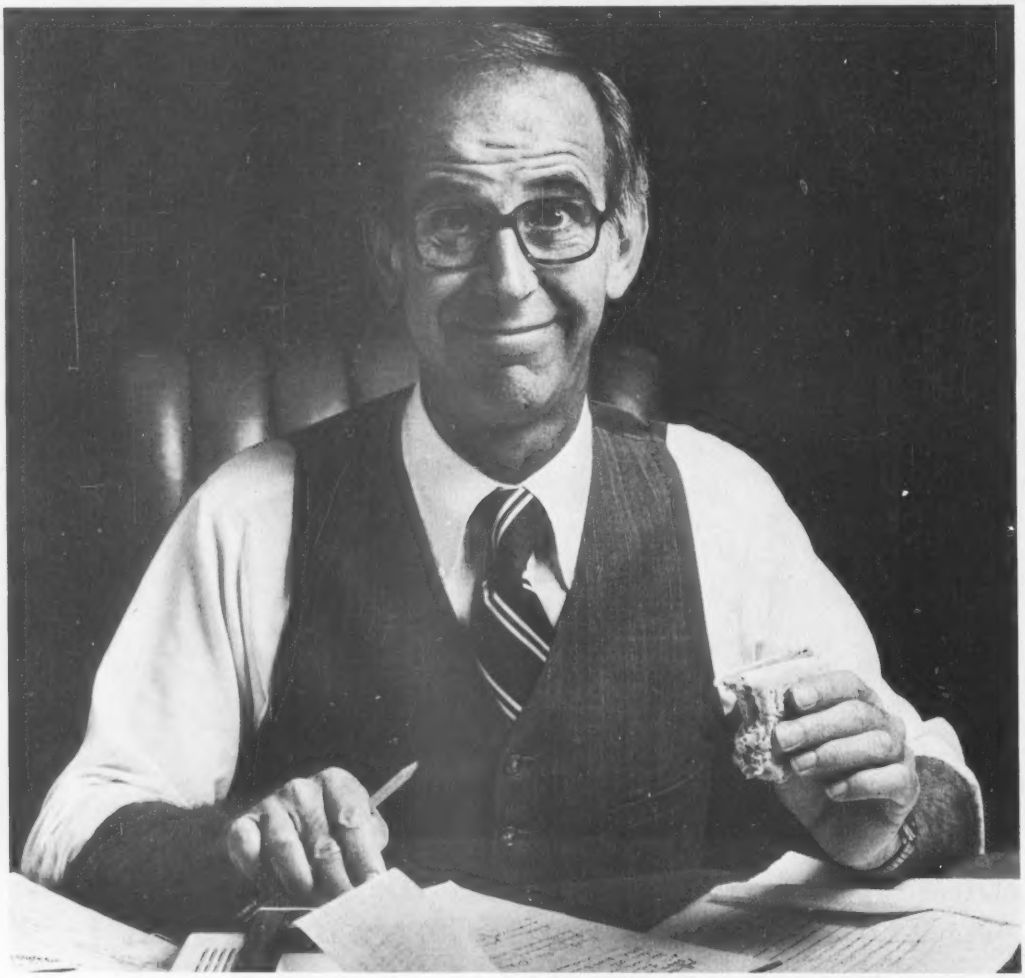
Executive Inquiry

Another UFO feature Rose cited is its executive inquiry capability, which reportedly makes it easier for the end user to understand. With the UFO selection/extraction feature, Gelson's liquor and wine buyer is able to produce his own reports on-line, selecting from thousands of items with up to four selection criteria and sorting up to four fields.

Under the former DMS system, the buyer would have sent Rose's department written report requests and waited two or three days while someone produced the reports. "The paperwork and waiting time involved with this batch-type of system probably means he would not have made the requests at all and still be working with several-day-old information all the time," Rose said.

Since his staff consists of three programmer/analysts, a high priority for Rose is conserving design time and increasing programmer productivity. UFO reportedly is fulfilling these requirements.

"I can honestly report that once a file has been defined in UFO's master dictionary, a user can have a browse screen with multiple record repetitions, complicated edits, copy and merge logic and multiple record update in less than 15 minutes, once he understands UFO," he said.



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computers, the firm said.

The company had obtained a software package (general ledger, accounts receivable and accounts payable) and had successfully marketed it. The system was beginning to generate enhancement requests.

In order to slow this rush of program requests and minimize programming time to system maintenance (as opposed to system development), Midwest Data decided to make a number of utility programs more user-oriented.

DEC had supplied the company with Decform, a screen generator similar to IBM's DMS/VSE that is capable of handling file I/O; Sortg, a sort generator; and Printu, a report generator, when it acquired the OEM license.

These utilities require a control file as input and generate a Dibol program as output. After compiling and linking, the Dibol program may be executed with a simple run command.

The control file is a series of statements that are almost JCL-like which describe the input file to be sorted, printed or displayed; and the output, which is a report, screen or a sorted file.

Predefined Information

The company is predefining as much of this control information as possible for each file utilized by its systems.

It can then write a Dibol program that asks the user, via a CRT terminal, a series of generally multiple-choice questions. Based on the answers, it can then finish building the rest of the control file.

Midwest Data executes the appropriate utility program automatically and compiles and links the generated Dibol program. The user may then, without contacting the DP department, develop customized reports and screens, the spokesman said.

Record-Select Program

The company is also developing its own record-selecting program. This assists the user who may not want to have every record on a file printed on a new report. For example, the user may wish to see only those customers who have an outstanding balance and whose last payment was made more than 30 days ago.

This feature is implemented on only one file to date, but the company expects to finish this soon, a spokesman for the firm said.

What is there to gain in giving the user the same utilities programmers have always had?

Reduced Dependence

Midwest Data believes it has dramatically reduced the user's dependence on its DP department.

The company has reportedly almost eliminated any extra costs the user would have to absorb for customized programming. The user can do what Midwest Data does without having to wait for the latter to define, analyze, code and test.

The user also gains flexibility. Normally, it is not possible to have a new field added to a report. Now, it can be, according to the spokesman.

From Midwest Data's perspective, the hardware manufacturers have developed utilities and it is up to the company to pass these on to the end users.

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IBM Users Polled on Operating System Plans

FRAMINGHAM, Mass. — Does a change in CPU hardware necessarily mean new operating system software? Not always — according to International Data Corp.'s (IDC) report on the "IBM Software Environment."

Users at some 751 IBM sites across the nation were asked which operating system(s) they intended to use on any additional or replacement hardware by year-end 1981.

IBM 360 users clearly indicated that the most popular migration among the 360/30 and 360/40 population will be to the 4331 machine, with the 4341 preferred by the top end of the 360 line. Predictably, the majority of respondents making exactly these changes will operate in a DOS/VSE environment.

However, many of the 360 users showed "considerable allegiance to their present operating system," IDC noted. Those choosing to upgrade to a more powerful 360 model will maintain their DOS software for the most part and several of the future 4300 users also will keep their current operating systems rather than move to DOS/VSE, based on the survey sample.

'As with the 360 installations, there is a definite display of software loyalty among 370 users. A "considerable percentage" of the 370/138 and 370/148 shops that are migrating to the 4300s intend to take their VM/370 operating software with them.'

The report also brought out a clearly illustrated preference among 370/115 and 370/125 users for the 4331 computer. System 370/135 respondents were split between the 4331 and the 4341, but users of the 370/138, 370/145 and 370/148 models will go with the 4341, the report said.

DOS/VSE will be the preferred operating system environment for the shops acquiring some version of the 4300 series. In fact, more of the 370 installations will choose to run DOS/VSE on these processors than will the 360 users, IDC pointed out, since all of the CPUs currently running with DOS are upgrading to DOS/VSE.

Software Loyalty

As with the 360 installations, however, there is a definite display of software loyalty among 370 users. A "considerable percentage" of the 370/138 and 370/148 shops that are migrating to the 4300s intend to take their VM/370 operating software with them, the report said.

Some version of the 30 series is the obvious move for the 370/158 respondents, and all of the 370/168 installations that are planning to upgrade will target the 3033, IDC said.

CPUs that are currently running OS/VS2/SVS will switch to MVS if the installation has any intention of acquiring another machine, according to the survey. And, 11 of the 12 IBM 370 respondents that are going to the 168 will operate in an MVS environment, IDC noted.

Any additions or migrations that occur within 30 series users naturally involve changes in this family alone, according to the research firm, and these shops will use MVS. "This makes sense in that this operating system [MVS] provides an important bridge to new system architecture," IDC observed.

Master Controller

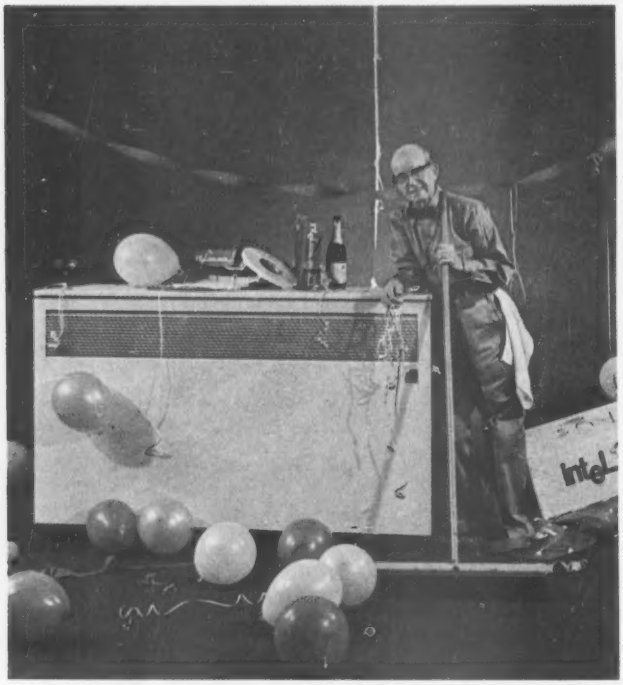
In the long term, IDC predicted a new operating system to accompany the development of new hardware as IBM's 3081 grows upward.

The new system software will probably offer VM-like features and may serve as a "master controller" for MVS machines running off 360 and 370 processors, the IDC study speculated.

The market research firm also indicated that IBM's announcement of the 4341/2, the 3033S and the 3081 may change some of the survey respondents' expectations. Since the vendor announced MVS support for the 4341/2, for example, IDC felt that many of these processors would be sold to large sites as MVS development machines.

"These variables will consequently affect the planning of any software environment for year-end 1981," the report noted.

Perhaps that is why several of the survey respondents that found it easy to list projected CPU changes were unable to indicate what software would be running on new hardware, IDC said.



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IDC Survey Finds

Bigger the IBM Site, More Development Tools

FRAMINGHAM, Mass. — The bigger the IBM mainframe, the more likely that installation programmers will use on-line editors and checkout systems for program development, according to a study from International Data Corp. (IDC) here.

In its report on the "IBM Software Environment," the market research firm found that nearly 85% of respondents with IBM 30 series equipment used one of these program development software tools, with the figure climbing to 92.9% in 3033 shops.

And, IBM's own Time-Sharing Option (TSO) overwhelmed any competition in large-scale environments, the report continued, with almost half of the respondents choosing to use it for development.

While IBM's VM/Conversational Monitor System (CMS) was used to almost the same extent as TSO on the low-end 3031, the larger processors "clearly preferred" TSO, IDC noted.

Among the independent software vendors, Applied Data Research, Inc.'s (ADR) Roscoe product captured 5.8% of the users in the 30 series group, with packages installed on all of the models. Vollie, another ADR product, did "quite well" on the 3031, but wasn't being used heavily on the larger models in the series, the survey continued.

'Users of the IBM 4331 are also jumping on the automated program development bandwagon, with almost 70% of the machines running one of these packages. However, the product preferences change for these mid-range CPUs, with IBM's ICCF proving most popular in two-thirds of the shops. OWL was tops among the independent packages, with 7.4% of the sample choosing it.'

Again emphasizing the importance of program development software at large shops, IDC found that nearly 50% of users with 370s use some type of tool for this task. The relatively small 370/115 shops used these packages some one-third of the time, with between 80% and 100% of the high-end 370 computers running some sort of on-line editor or checkout system. Newer models in this family seem more open to this type of utility software than older ones, IDC observed.

As with the 30 series, IBM products were in the majority, based on user responses. That vendor captured a 65% market share, with TSO again proving most popular. VM/CMS, followed closely by Interactive Computer Control Facility (ICCF), Source Program Maintenance (SPM) and Entry Time-Sharing System (ETSS) captured almost 12% of the 370 market in this area.

ADR's Roscoe again led the independents since it was used by 7.7% of the respondents with NCI's On-line Without Limit (OWL) package coming in second among the non-IBM offerings with a 4.8% market share.

Panvalet from Pansophic Systems, Inc. proved "quite successful" in shops using the 370/138, IDC noted. But the 138 appeared to be the model using the most diverse number of packages, with no one product utilized by more than 18% of the shops surveyed.

Users of the IBM 4331 are also jumping on the automated program development bandwagon, with almost 70% of the machines running one of these packages. However, the product preferences change for these mid-range CPUs, with IBM's ICCF proving most popular in two-thirds of the shops. OWL was tops among the independent packages, with 7.4% of the sample choosing it.

And the profile changes yet again among the 360-user population, the report continued. Just less than one-fifth of these installations opted to use an editor and/or checkout system for program development. No more than 26.7% of these machines, on any one model, had packages running to complete these functions, according to IDC.

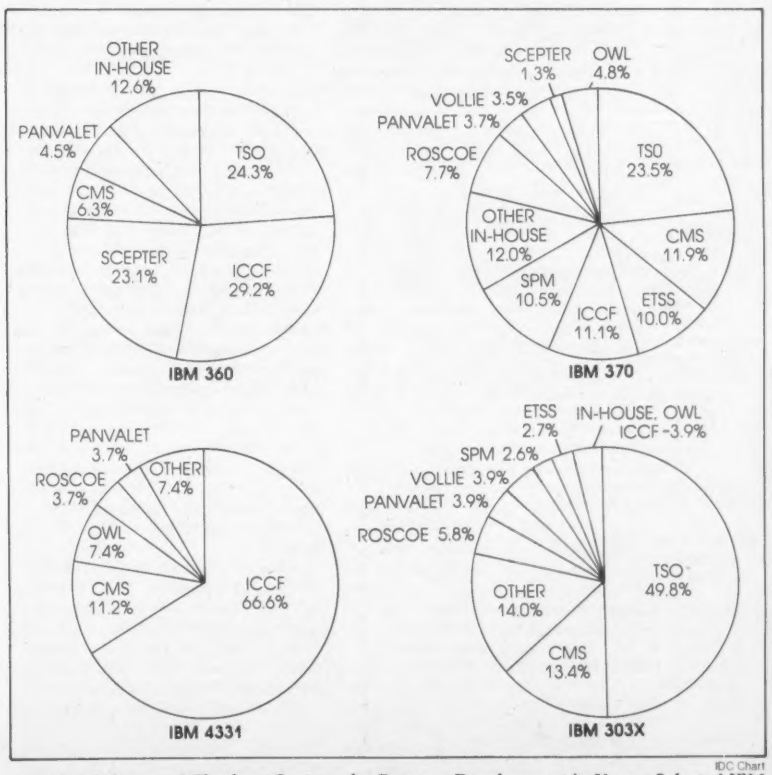
This market also differs from the 370, 4331 and 30 series areas in that it is not dominated by any one product and the independents have succeeded in taking over a relatively hefty share of it.

IBM No. 1

IBM was still No. 1, with ICCF preferred by 29.2% of shops with CPUs running program development software. TSO was the second most popular offering with a 24.3% share, based on replies from these respondents.

However, Scepter from Westinghouse Electric Corp. ran a respectable third; it was preferred by 23.1% of those surveyed, making it the largest independent supplier to the 360 shops.

The report, entitled "IBM Software Environment," is available for $2,500 from IDC at 5 Speen St., Box 1450, Framingham, Mass. 01701.



IDC Chart

On-Line Editors and Checkout Systems for Program Development in Use on Selected IBM General-Purpose Computers; U.S. Installed Base, December 1979

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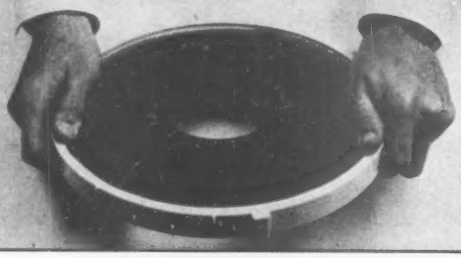

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Report Package Speeds Price Index Revisions For U.S. Labor Department

WASHINGTON, D.C. — The U.S. Department of Labor's Bureau of Labor Statistics saved 25 man-months of programming while revising the Producer Price Index (PPI) by using an extraction and reporting system.

Issued monthly, the PPI provides comprehensive, detailed and timely data covering producer price changes in the nonretail segments of the economy. It is used by businesses in escalating purchase and sales contracts and by economists in making price trend and market analyses, as well as economic forecasts.

The government uses the PPI to form economic policies and to deflate the gross national product. Academicians use it in economic models and for various research projects.

The bureau's revision of the PPI was intended to create a new and expanded list of products and prices and, eventually, to eliminate the old list, according to a spokesman.

Before the project was initiated, the old PPI system maintained 10,000 prices each month. Data for this report was managed by Cincom Systems, Inc.'s data base management system (DBMS) Series 80 Total, a Bureau standard running on an IBM 370/148 at remote facilities under an OS/VS2 operating system.

To manage the increased amounts of data involved in creating the new PPI, which is projected to eventually include more than 100,000 prices each month, the bureau expanded its system substantially.

The new system's capabilities include four additional Total DBMS with 25 files. Rich Fecher, systems manager for the Producer Price Area, said, "With that many files and data elements to work with, our DP staff needed a simple listing tool to keep us informed of what data was in the data base at all times.

"In addition, we needed the ability to access the information in our files directly to review and evaluate it, making sure the system was working the way we wanted," he added.

Additional listing programs generally would have to be written and run against the Total files to obtain this information. "By using [Cincom's] Series 80 Socrates reporting and extraction system, we totally eliminated this step," Fecher said.

"Socrates enabled us to retrieve and review the data we needed, so listing programs were not necessary," he said. "We were therefore able to save 25 man-months of valuable programming time at the initial system implementation and start-up of the project."

Cincom's system also saved time in training programmers who had limited experience in using the Series 80 Total DBMS. "With Socrates' ability to view data within the data base, Total became transparent to our programmers," Fecher explained. "They were able to start working with the system with little or no training."

The changes in the PPI were geared toward improving its scope and accuracy. The bureau also wanted to improve the analytic framework of the indexes, making them more useful. Scientific sampling procedures were adopted to provide unbiased coverage and to permit calculation of statistical variances and standard errors to measure the precision of the data in the PPI.

Random Interviews

Price and product information is collected through interviews with randomly selected corporations and added to the new list. If similar information already exists on the old list, it is eliminated from the old PPI. New information is entered every January and July.

Reporting for the old PPI has dropped from 10,000 prices to 8,000. The discontinued prices have been replaced by data from the new, revised PPI which has grown to 20,000 prices.

Fecher said, "As part of the whole system, Socrates has saved the DP staff valuable programming time, both in the start-up of the project and in ongoing maintenance as the PPI continues to grow and improve."

In line with this growth, the Bureau has expanded the use of Cincom's report and extraction system. Before any new pricing data is added to the PPI, the production staff economists analyze and approve the information, which is contained on production and review listings.

"Initially, these listings were obtained by designing programs, usually taking weeks," Fecher said. "Using Socrates, the listings were obtained in hours or a day."

Socrates was also used to handle emergencies or priority requests, including new file enhancements or changes, or the start-up of new projects. It enabled the DP staff to verify existing data in the data base and make changes when necessary.

Its use eventually was expanded, on a smaller scale, to users who wanted to view data in the system. Other departments also began using the extract and reporting facilities of Socrates to assist their ongoing projects, such as the International Price Program and the Employment Cost Index.

The bureau's project to revise the PPI has continued to grow successfully. When the PPI is expanded again in July, the bureau expects to list close to 35,000 prices from 100 industries.

Fecher attributed part of the success of the PPI project to the "efficient implementation of the additional systems capabilities that were required to handle this major undertaking. With the right tools, the project got off to a quick and successful start and has continued in that direction."

He said Socrates is continuing to provide quick turnaround in the ongoing maintenance of the new PPI.

'DP Auditor Taking Over'

Two Heads, One Thought: Automated Audits

Two heads of DP audit functions for major corporations in different locations reached the same conclusion that the auditing profession is becoming more and more computerized, and, after separate searches, chose the same audit package to fill different needs.

"The traditional auditor is becoming obsolete. The DP auditor is taking over," Phil Warren, corporate manager of information systems auditing for Weyerhaeuser Co. in Tacoma, Wash., said.

Warren said the time has come when the auditor must realize he is in the DP business whether he likes it or not and must investigate the tools available to him and take full advantage of them. Running an audit department without the use of audit software costs the company money in a variety of ways, he added.

It is particularly difficult for auditors to keep up with technology because the traditional nature of auditing is not one of "keeping up," Warren said. The auditor's role is to move in after the fact and use his skills to verify that records and company statements are accurate.

Keeping up with technology has not been a factor until recently. Now, the records the auditor must deal with are on a computer, and the auditor must adapt.

The signals that told Warren it was time to adapt were the presence of embedded self-generating transactions, a data base environment and on-line input. These factors eliminated the use of traditional auditing methods. Major changes were made in Weyerhaeuser audit operations.

Shopping for Software

Shopping for an audit software package began in early 1980, and Warren chose Dyl-Audit from Dylakor in August 1980.

Michael Taketani, western regional DP audit manager for The Times Mirror Co. in Los Angeles, selected Dyl-Audit in late 1979 after noting that the auditing profession is increasing its emphasis in the use of the computer as an audit tool.

"I had DP requirements from an audit standpoint and had to have a package that was flexible, could handle variable- and fixed-length records and functioned at a relatively high level so there would be minimal time involved in developing new routines," Taketani said.

Price was not a major issue at Times-Mirror. According to Taketani, the important factor was that the product met his DP department's requirements.

Unlike Taketani, price was an important factor for Warren. He set out to find a package that would do the most for him for the least cost. After considerable shopping, Warren felt that most of the major packages have the same capabilities to one degree or another, including frequency distribution, sampling, aging and letter writing.

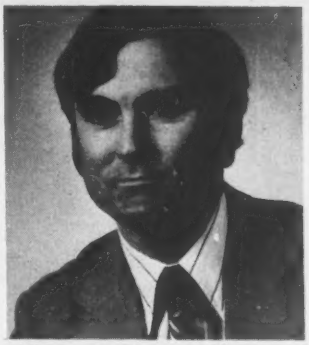
A major requirement was that it function on both OS and DOS systems to avoid the cost of training people on more than one audit package. Dyl-Audit met these needs.

Both men shopped in similar styles. They wanted word-of-mouth references rather than vendor pitches. Warren said, "We sent our people everywhere to talk to DP centers in other companies and to attend DP conferences. We did not contact a vendor until we had made our decision. Dyl-Audit stacked up fast." He evaluated more than a dozen packages.

Taketani also shopped by contacting other DP auditors and people who worked in the DP industry. Also, he had prior exposure to other software packages and knew the general limitations.

Dyl-Audit is a companion product to Dyl-260, a report writer/utility from Dylakor. Taketani already was a Dyl-260 customer. When Dyl-Audit became available, for a small additional cost, it could have been added

Michael Taketani, Western Regional DP Audit Manager, The Times Mirror Co.



Phil Warren, Corporate Manager of Information Systems Auditing, Weyerhaeuser Co.

to their system simply by making a phone call. Taketani wanted audit software that would meet his needs even if it cost more. After extensive review of Dyl-Audit's specifications, he chose it on its own merits.

For Warren, the choice of Dyl-Audit meant that Weyerhaeuser received the whole Dylakor system. Of the audit package, he said, "The Dyl-260 part — the report writer — is going to be the most important piece for some of our audit applications."

He said the sampling, frequency distributions and letter writing are going to be valuable, but, ultimately, it will be the ability to take the information and format it in such a way that the financial audit team will not have to spend its time generating the schedule it will do its work on.

It eliminates getting the information out of the file manually and printing it on a work schedule, Warren explained, adding, "Things are working out very well, but we wish we had given ourselves a little more of a head start. Now that we have audit software, we look back and say we should have made the investment sooner." He said he sees a major gain in productivity per man-hour and additional areas of benefit are becoming visible.

Times Mirror and Weyerhaeuser audit very different environments. Both companies are corporate giants with many subsidiaries. Times Mirror specializes, for the most part, in subscriber communications services. *The Los Angeles Times* is a major subsidiary. The company has 36 subsidiaries that operate as separate business entities.

Their hardware is widely diverse and much of it is incompatible with the multiple IBM 3032 and 370/158 environment at *The Los Angeles Times* and corporate headquarters.

Subsidiary revenue files are largely homogeneous since the bulk of the operations is subscriber services with consistent amounts flowing in. To audit these various operations efficiently, it is helpful to have a flexible package which can convert data to IBM-compatible format.

Weyerhaeuser specializes in lumber and wood products. A push toward compatible hardware at all major locations is almost complete. The last two locations are presently converting to 4331 hardware. Homogeneous hardware throughout the corporation is one step towards reducing the cost of DP and increasing its efficiency.

A summary made two years ago revealed more than 200 major financial applications currently maintained by the company. These are now under study for streamlining. "Our hope is that we will discover seven to 10 sys-

(Continued on SR/30)

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Medical Laboratory Calls Report Tool Indispensable

DENVER — Forty individual data bases and a set of demanding end users at the University of Colorado Health Sciences Center have posed few problems for a nonprocedural report writer.

The report writer has become "indispensable" at the center's Medical Computing Lab (MCL), according to Tom Kimball, a scientific programmer here.

"We have found Enform [from Tandem Computer, Inc.] appropriate for the medical research environment because it's easy to learn and is flexible enough to satisfy the queries of more demanding users," he said.

Since it was installed in January 1980, Enform has multiplied programming personnel effectiveness within the MCL and gives the end user real DP involvement when required, he continued. These payoffs are both appreciated and "essential for our small staff's survival."

The software supports data base query on MCL's Tandem Model 16. It allows users to generate the following types of reports:

- List of selected fields within a file.
- Conditional list of selected fields within a file.
- List sorted on one or more fields.
- Sorted list including counts, averages or totals.

Most nonprogrammers progressed through these levels of difficulty and could utilize one-to-one links between relational files after about a week of frequent use, he claimed.

Reports requiring more complex links or the production of intermediate data files had to be set up by technical specialists who knew how the file system works. But these reports can be routinely run by anyone, he noted.

Enform was designed to take advantage of keyed access to data whenever the request will allow it and the package automatically creates sort processes when keyed access is not available, the programmer explained.

Its syntax also enables the "enlightened user" to obtain a lot of information from his data base in a single pass, he continued. However, a nonprogrammer with involved requests can occasionally overburden the system with sorts and multiple passes through a large data base. Therefore, "it pays to educate," Kimball said, "but for the most part we've been able to let our users fend for themselves."

Data Dictionary

A seven-file data dictionary describes each data base and a data definition language compiler is used to create the dictionary and update its record description and access key information, the programmer said. Since the record descriptions may refer to any type of file, it is relatively easy to assemble an Enform data base from preexisting data files. "We have found that inexperienced users learn simple relational data structures readily because the data base record structure can correspond one-to-one with the coding sheets that researchers naturally tend to design," Kimball said.

MCL programmers are using Enform for data base access as well, Kimball observed. Standard procedures are provided in several languages, including Fortran and Cobol, to make access comparable to a standard READ statement.

Enform optimizes access to the data and guards against inadvertent changes to the physical structure of the data, he maintained.

Firms Automate Audits

(Continued from SR/29)

tems duplicated 10 to 12 times," Warren said.

Once these dominant systems are identified, some of them will be selected to become what Warren calls "common flexible systems." These will be introduced throughout the company to simplify and speed the audit procedures, as well as reduce data maintenance staff needs, he added.

Both Weyerhaeuser and the Times Mirror use Dyl-Audit in audit planning. Taketani often uses the frequency distribution function to look at the character of his files. A printout in histogram form gives a visual picture of the file. Intervals can be by count or value, equal or logarithmic.

This method gives the financial auditors a representative selection from the file. "Without the frequency distribution, we might miss the larger amounts. This way we can select them all for further analysis, if necessary," Taketani said. Once the files are analyzed in this way, they are turned over to specialists in the audit team for processing and follow-through.

Warren noted that the Dyl-Audit package is fairly new at Weyerhaeuser and they are just beginning to discover the ways it can be used, but he predicted it will be important in the planning phase.

As an auditor, adapting to the use of software tools is closely tied to a sense of readiness on the part of the auditing team. Warren said Weyerhaeuser had utility software in the auditing department earlier, but it was only marginally successful and then dropped.

"We did not search significantly enough for the opportunities to find the benefits to be gained," he said. The department was not ready at the time to make the changes, nor were they experiencing the need to make them. When the need hit, however, changes were made immediately.

Dyl-Audit offers 10 sampling methods, including letter writing which is designed for any type of letter generation. At the Times-Mirror, Taketani uses this to print detailed records of selected items for test or transaction purposes for his financial auditors.

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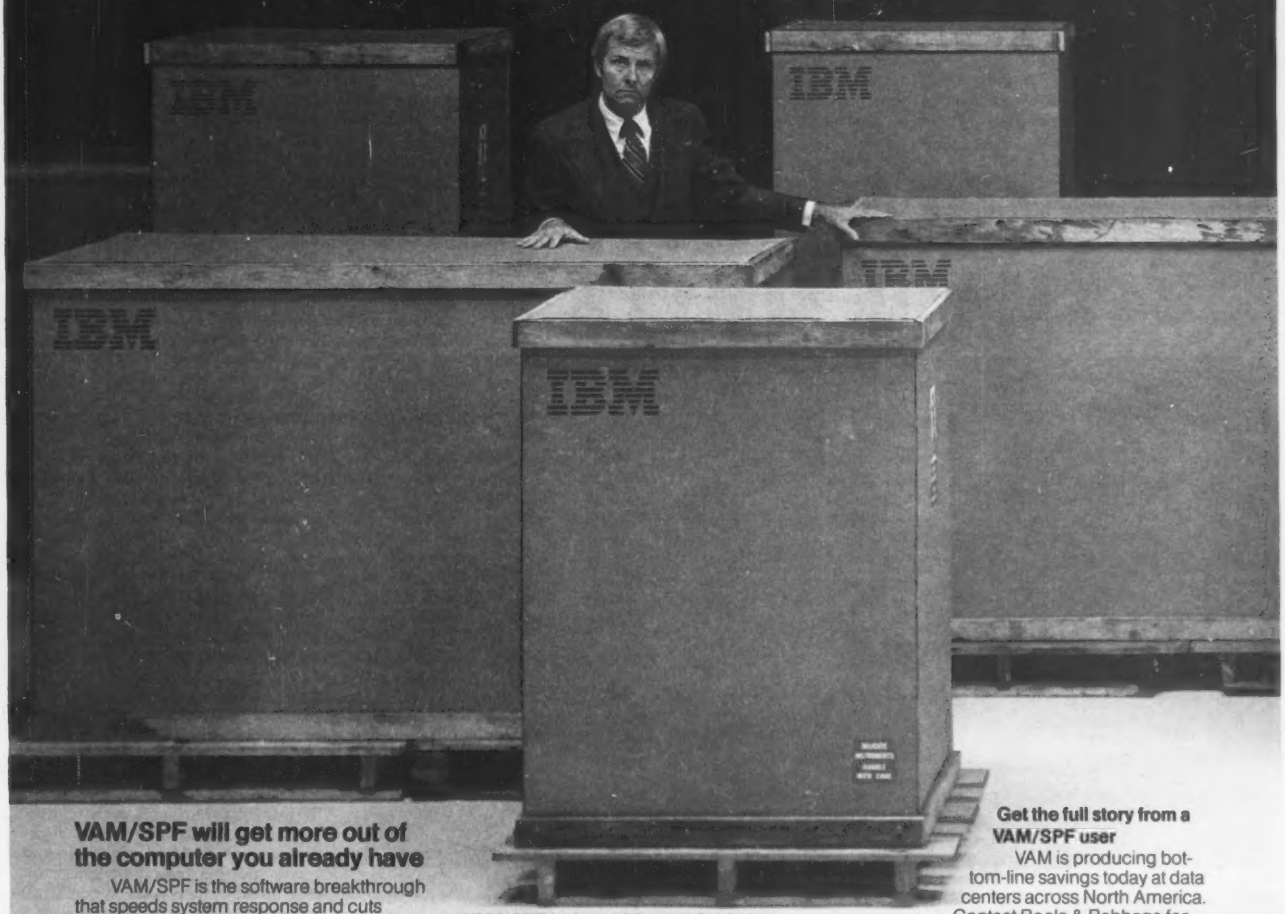

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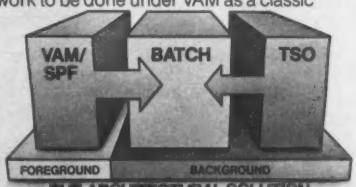

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CAMBRIDGE, Mass. — In a time when advances in hardware outstrip the ability to program that same hardware, when there is a severe programmer shortage and when increased programmer productivity is a rallying cry, there are compelling reasons for language and operating system standards.

BBN Computer Corp.'s decision to stay with a single language (the C language) and operating system (Unix) for the C/70 computer it introduced last year [CW, Oct. 27, 1980] was based on developing software and hardware systems suited to a wide range of specific consulting and research applications. This experience brought out the need for a language and operating system mix that provides portability without sacrificing broad functionality. The C language and Unix operating system combine effectively to satisfy these requirements, the firm said.

BBN's professional services groups expend a lot of time and effort in building software and hardware tools to address applications for a diverse customer base — a familiar situation to most information systems technicians. Choosing from a wide variety of languages, operating systems and hardware for each application was clearly inefficient since different employee groups were unable to share tools and much effort was duplicated.

End users are not alone in the search for the right software tools for system development in a specific environment. The reasoning behind one vendor's choice of machine language and operating system are outlined here. Perhaps its criteria can provide some guidelines for information systems managers involved with similar choices.

However, a standard language and operating system allow tools to be exchanged between different professional groups and adpated to particular needs. The effort devoted to redeveloping outmoded utilities is thus reduced and programmer productivity is maximized.

Portability is the key to software investment protection and software is portable only when it conforms to recognized standard specifications. The language is the crucial element in determining the longevity and utility range of any piece of software. So, BBN looked for a language specifically suited to systems programming and development with the objective of optimizing a user-programmable system.

Several languages were examined before BBN decided on C. While Fortran and Cobol have the advantage of conforming to American National Standards Institute (Ansi) standards, the firm's technical specialists regarded both as specialized languages — Fortran for scientific research and Cobol for business systems. Lisp was also considered, but was deemed unsuitable for systems programming because of the high memory level and execution time it requires. What BBN wanted was a subtle language that could be adapted to a wide range of programming tasks.

Principal Features

The C language appeared to meet these specifications. Principal features include economy of expression, modern control flow and data structures and a good set of operators. Thorough documentation and explicit parameter definition also contributed to accepting C as a standard conforming language.

With a compact and straightforward vocabulary, it is in a programmer-accessible form because of its high-level syntax and construction. Because C deals with object types that are manipulated with standard arithmetic and logical operators incorporated by hardware, it combines the positive characteristics of both a high- and a low-level language.

C's accessibility combine with its abstraction level to make it ideal for system coding. It is equally useful for developing major numerical, text processing and data base programs and writing new operating systems.

Unlike Fortran, Cobol and Lisp, C is not specialized for any particular application area, and this generality makes it more convenient for many tasks than the more highly specialized languages. C's machine independence also eliminates any conversion effort required when transferring software from one machine to another.

It was a short step to Unix from C. The Unix operating system originated at Bell Laboratories between 1969 and 1970 and was rewritten in C language three years later. Since C has been closely associated with Unix since its design and implementation, the decision to standardize on C mandated the choice of Unix as operating system.

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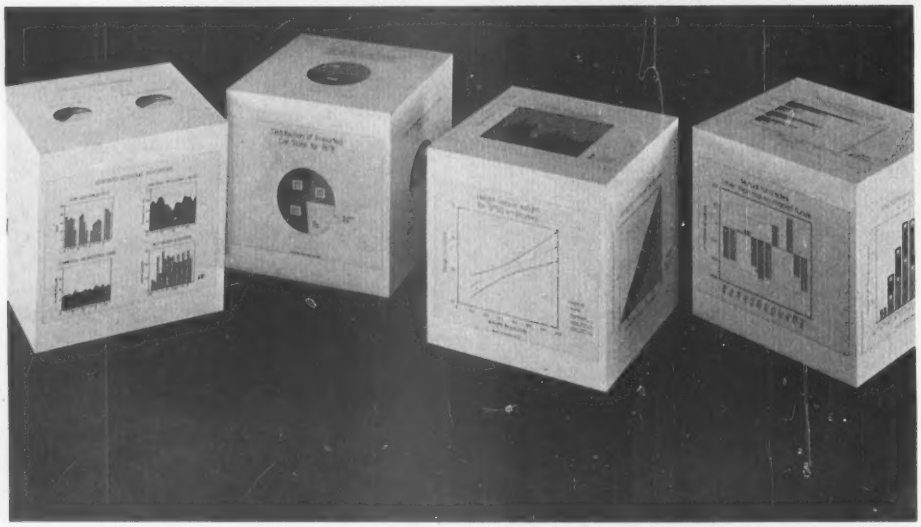

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Aerospace Firm Adds Speed

System Lets Non-DPers Make Screen Inquiries

BETHPAGE, N.Y. — The need to speed up information processing motivated Grumman Aerospace Corp. here to the decision to develop a system that could be used directly by non-DP professionals, Frank Bonino, manager of the firm's Configuration and Data Management Department, explained.

The resulting search led to Informatics, Inc.'s Inquiry IV/IMS, which was installed in Grumman's batch configuration verification and traceability (VAT) system, which operates on an IBM 3033 with approximately 90 terminals.

Installation procedures included screen inquiries to be formatted and cataloged at the end-user level, adapting the VAT system to operate as part of the corporate on-line teleprocessing system. Total elapsed time to bring up the system was two months, Bonino said.

A user manual also was created and distributed to all department personnel. Shortly thereafter, new requests for additional screens were received. These screens were developed in 10 to 15 minutes and then called back to the user via telephone, he explained.

"We were responding quickly to the requests, but the volume — 280 inquiries to date — was bogging down our ability to distribute timely updates to the user manual," Bonino said.

Dummy Model

To solve the problem, his department developed a new menu screen. Since the VAT System was updated every night, they set up a dummy model for each of their six data bases and used the existing VAT system input sheets to input each catalog name.

This included punching in input parameters and a brief description of the type of data shown on the screen. By making use of each variable name feature on the Inquiry IV/IMS package, screen headings were changed to more closely match the displayed data.

A new inquiry was cataloged under the name "Menu" and given to department personnel. The new menu screen now handles daily updates, replacing the user manual completely, Bonino said.

When Grumman received a contract from a commercial aircraft manufacturer, the system was altered again. The request included a drawing and an associated documents numbering system that was incompatible with its existing computer systems.

Therefore, a Grumman number system was developed. Using the same technique that was used for the menu screen, an Engineering Release Records system was created, which cross-referenced the customer number to Grumman's.

Total time to create and implement the new, on-line teleprocessing (TP) system took two days which, according to Bonino, was an estimated 170% savings over an expected six-month creation time through the DP department, assuming programmer availability.

"Since using the Inquiry software package, at least 11 other on-line TP systems, all of which utilize the VAT system data base for storage, updating and retrieval, were executed," Bonino said. "Each took about two days to design and implement, with the user loading data into the data base on the third day," he added.

A last consideration was whether a non-DP person should be given the capability to format and catalog inquiries or whether control should remain in the hands of DPers. "At Grumman, we were able to extend control to both," Bonino said.

User Analyst

By assigning only one or two terminals a cataloging transaction code, the user at the terminal became the department's system analyst, generating all original requirements. Since there would be only one person trained in the use of Inquiry IV/IMS, any requests for additional information or cataloged inquiries would be directed to that analyst.

"Generally, in as little as 10 minutes, the user would have the inquiry," Bonino explained, adding, "If any changes were required, a simple phone call to the department analyst would have the user back in business in minutes with a copy of the cataloged inquiry, forwarded on to the DP department for backup inclusion."

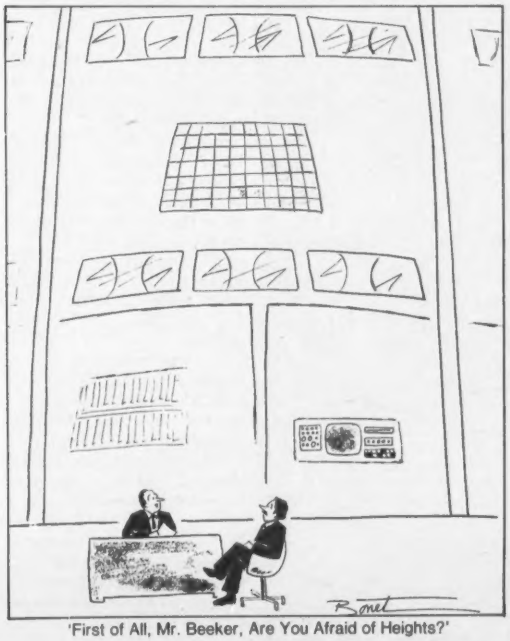
Use Spreading

This system has worked successfully since 1978, Bonino maintained. He said use of the system has spread to many other Grumman departments where it is used in either on-line or batch modes.

Reasons for allowing user capability have become obvious, according to Bonino. Users develop requirements, design data bases and are most familiar with the stored information. This enables them to qualify and fulfill requirements, constantly checking the system for information malfunctions, he explained.

This also frees DP personnel to concentrate on the design and implementation of new systems instead of programming new screen and special extracts for users from the existing systems, he added.

"Of course, non-data processing professionals given these capabilities are still not considered programmers, since their work is for specialized cases. Nevertheless, if in two days a system can be brought up by end users, even for individual application, we have come a long way in making the computer a more usable and even friendly tool," Bonino said.



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Documentation Aid Proves Boon to Gas Firm

MINNEAPOLIS — Minnesota Gas Co. "grew up" with the DOS operating system, progressing from IBM 1400 series equipment through various models of the IBM 360.

As the company's processing needs grew, so did its need for a more sophisticated operating system. Planning for its conversion to MVS began in 1979 and by March 1980 the actual conversion was initiated.

An IBM 3032 was acquired to provide computational resources during the conversion and an outside contractor conversion team was selected to work with Minnesota Gas Co.'s programming staff on the change. Currently, the company is running DOS and MVS under VM.

A major issue was system-level documentation. Current documentation needed to be updated to meet standards. In several cases, new documentation had to be developed.

In December 1980, Minnesota Gas was introduced to Diversified Software Systems, Inc.'s (DSSI) Docu/Text-200, which appeared to be aimed specifically at its problems. The company decided to test it in mid-January as part of a 30-day free trial plan offered by the vendor.

Several of Minnesota Gas Co.'s systems were able to run through Docu/Text immediately and report outputs matched a number of its documentation requirements. Among the firm's most important reports are the system flowcharts, required turnover documents.

The company had anticipated spending $40,000 for the conversion team to provide these. Docu/Text could provide these flowcharts automatically from Minnesota Gas Co.'s JCL, according to Robin Hujda, the company's documentation coordinator.

Although the company could have justified Docu/Text solely on the basis of the direct labor savings on the flowcharts, the company saw other benefits, according to Hujda.

General Index

The package produces a general index and table of contents that show which reports have been selected for a particular run, and a listing of all the jobs, procs, programs and files that are referenced in the system being documented.

These reports can be used to check adherence to naming conventions. The company could put its Docu/Text-generated documentation on microfiche with an index that would help it locate any element of a system when it is on fiche, according to Hujda.

Docu/Text performs a syntax scan and produces an expanded JCL listing of the JCL being documented, including proclib, which is intended to offset the input from the proclib JCL. As each new job, proc, program or DD statement is encountered, Docu/Text generates an index that is displayed to the right of the JCL.

Following the JCL listing, Docu/Text prints a summary of any JCL errors that have been detected and an analysis of the disk space requirements for each job.

Programmers can use the package to see that the JCL is clean before it is submitted for execution, Hujda explained.

As a by-product of having digested the JCL, Docu/Text produces an optional condensed job listing report in lieu of the full JCL listing.

The package can provide an optional data set cross-reference for a job or an entire system. This will enable Minnesota Gas to determine all of the jobs, procs and programs that are affected by a change in file structure, according to Hujda.

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Utility Package Keeps Magazine in Circulation

CARMEL, N.Y. — During the past few years, *Guideposts* magazine and its DP department have grown quite rapidly. The DP work load has grown just as rapidly, according to senior programmer analyst Ray Kludys.

With the cost of enlarging or just maintaining a competent programming staff escalating so rapidly, *Guideposts* decided it was necessary to either improve the efficiency and productivity of its staff or face cutbacks on a number of new projects, some of which were deemed vitally important to the company's growth.

The staff took a close look at the DP department to see where improvements could be made.

Deficient Utilities

One problem was the lack of a good all-purpose utility program, Kludys said. The staff spent far too much of its valuable and expensive time either using IBM utilities, which they found confusing to use and poorly documented, or writing time-consuming, one-shot programs, Kludys said.

This was most evident in test data creation and test output analysis, he said. There was no easy way of creating small test files without writing one-shot programs, and there was no way to verify test output except by dumping large amounts of data using IBM OS Ditto.

The DP department also lacked an easy way of putting its test files on disk. This resulted in a lot of time waiting for tape mounts.

Because of these problems, the testing and debugging portion of a project took a lot longer than it should have, Kludys explained. Because of time pressures, a program would often go into production without being as thoroughly tested as it should have been.

To remedy the situation, *Guideposts* decided to consider acquiring a utility package.

After comparing packages from varous software vendors, *Guideposts* bought a package called Xray that appeared to be best suited to its needs. Xray is an assembler-written, linked, procedure-oriented OS utility package that functions like a high-level computer language.

It is used in the *Guideposts* DP shop for such tasks as reports, selective file dumps, test file creation, test output analysis, file reformatting or reblocking, record reformatting and extract record creation.

Xray uses English-type procedure statements such as read, write, print, move and test. Kludys said his department is in the process of teaching some non-DP personnel to use Xray to help reduce its work load.

"Recently, some of our computer operators have been taught the use of Xray and they have incorporated it into several of our production job streams to do tasks like file or record reformatting," Kludys said.

Using the utility package has saved *Guideposts* considerable time and money, he said, adding, "As more and more people in our DP department become proficient in its use, the savings rate should increase."

The number of one-shot programs the programmers write is constantly being reduced, the work load has lessened and there is general agreement that Xray has improved efficiency and productivity, he concluded.

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Software Workhorse Triples User's Efficiency

SPRING HOUSE, Pa. — McNeil Pharmaceutical here has a system that is functioning as a "software workhorse," according to its DP manager, Andrew C. Herdan.

Users are working with the on-line programming system, O-W-L, from Quanex Corp./NCI, Inc. of Atlanta, Ga., for data entry and editing. Programmers use it for maintenance and development, and it provides word processing and electronic mail capability.

McNeil chose this software tool during a conversion from a DOS shop using Westinghouse Electric Corp.'s Westi teleprocessing monitor and Cincom Systems, Inc.'s Total to an OS/VS1 environment with IMS and CICS.

The company needed a migration tool that would help it reach its objectives with as much efficiency as possible while maintaining a high degree of control.

Since McNeil had been using NCI's Slick as its source program library system, the company decided to look at the O-W-L on-line programming system from the same vendor. After visiting a couple of user sites, McNeil representatives reportedly were impressed with how easy it was to use O-W-L. Use of the software tool has nearly tripled the firm's throughput and productivity, Herdan said.

From an operational point of view, one of O-W-L's greatest assets was its procedure language, according to Herdan. The company keeps all its production job control on O-W-L under various sign-on codes according to application. These are retrieved by procedures and then executed. "These 'procs' eliminate many repetitive functions, reduce JCL errors and help standardize JCL within our shop," Herdan explained.

"For example, since we have all of our operating job control set up under O-W-L procs, we can simply execute a procedure called Monday and bring in all the job control we need for our Monday scheduling," he said.

Herdan said that it is difficult to put a figure on productivity improvement using O-W-L as a production-control and operations tool, as contrasted with submitting and manually generating daily schedules. "One tends to forget what it was like before it was there," he said. "Certainly the ease of use and degree of accuracy in our production-control environment has been greatly enhanced with O-W-L."

Using O-W-L, McNeil's DP shop can view and interrogate the OS job queues and output queues, which enables the programmers to submit jobs almost one after another, Herdan said. As a job is completed, they can look at the output, make changes and then resubmit. Previously, programmers had to wait two hours or more just for the output, he explained.

Response Time

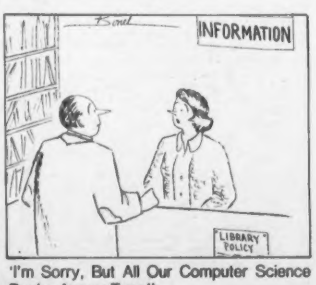
Response time also has improved dramatically, according to Herdan. Using CMS, response time was often 20 to 30 seconds or more. With O-W-L, it is in the two- to four-second range and overall throughput is improved, he said.

Another move McNeil made to enhance productivity was the installation of Digital Equipment Corp.'s VT 100 terminals with a 132-character screen width to facilitate viewing of listings. Now O-W-L can be accessed on the terminals, via McNeil's DEC 1090 system linked to an IBM 4341, using a protocol converter from International Computer Controls, Inc.

From a word processing standpoint, McNeil is using O-W-L to generate interoffice memos, status reports and schedules. It also provides an audit trail of events and problems. The company soon will be installing an IBM 6670, which will further enhance its word processing efforts.

The company also is experimenting with electronic mail. Instead of printing internal memos, these are inserted into the job queue and naming conventions identify the recipient. With the O-W-L view command, users can query the file for messages. "Although we're still wrestling with the security of such a message-switching system, the concept is evolving and holds promise for the future," Herdan said.

"Overall, we've had nothing but success stories with O-W-L," he said. "It has provided the tools to help us migrate smoothly from DOS to OS/VS1 and now to MVS. Each release has offered significant enhancements and has been easy to install."



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Package Eases Transition

Cemetery Director Moves DP Effort In-House

TREVOSE, Pa. — After 15 years of using a one-person "service bureau" that processed its data at a rented facility, Roosevelt Memorial Park here decided to explore the feasibility of setting up an in-house DP shop.

The change resulted from a general uneasiness about relying totally on just one individual to handle its work, coupled with the need for a reprogramming effort, according to Roosevelt Park's director, Harold Freed.

Freed said he worked with the service bureau person who agreed to serve as a "guru" and help Roosevelt evaluate hardware and software possibilities to determine if it would be practical to set up an in-house system.

Beat the Statistics

Roosevelt Memorial Park operates a cemetery with 22,000 burials at present, which will grow to approximately 75,000. There are 20,000 owners and 4,800 accounts receivable, along with a file of about 4,000 records covering special maintenance information. All of this data was to be entered on-line, Freed said.

In addition, the company mails about 8,000 invoices a year and makes heavy use of its records for lot owners and funeral directors. Inventory, endowment care information and general accounting are scheduled as future applications.

Very early in the planning stage, the problem of programming arose. Freed decided that if it were at all possible, an attempt would be made to do the programming in-house with the existing staff. As a moderate-sized company, Roosevelt was not in a position to hire a programmer.

Defining the company's exact needs and ultimate goals proved elusive, Freed said, and because it was only possible to see requirements in general terms, he decided it would be an exercise in futility to go the third-party programmer route.

The other reason for trying a do-it-yourself approach was cost. At an orientation meeting for possible first-time computer buyers, one supplier presented a statistic that related the cost of software to the cost of hardware during the life of the system.

Roosevelt was determined to try and beat those statistical results. The only remaining question was, "How?"

During discussions with one hardware supplier, a newly developed software package was described which the vendor claimed would enable Roosevelt to develop a system without previous DP experience.

If the package lived up to the vendor's claims, it was exactly what was needed. For a cost of $6,000, Roosevelt would receive this generalized software facility together with 40 hours of instruction.

Freed said the company felt it was on the right track and its plan for in-house self-sufficiency seemed attainable. Roosevelt was ready to commit when IBM, the hardware supplier it finally chose, came up with a seemingly comparable software package called Prompt, designed for use with its Series/1 system.

Prompt is a set of application building tools geared toward users who have no DP training. It communicates with the user through computer-generated video prompter messages.

After a discussion with a Prompt dealer, Roosevelt's guru felt that the package would be able to satisfy most of the company's requirements. Further investigation followed, including meetings with current Prompt users. Despite the fact that the people Roosevelt contacted were primarily using packaged programs built on Prompt and customized by their dealers, Roosevelt decided to purchase the package.

Final Decision

The cost for Prompt matched the competing software package, including the 40 hours of instruction. The final decision was based on the fact that Prompt had a more established track record than the competing package and that IBM could supply hardware that could accomplish what Roosevelt needed at a savings of about 15%, Freed said.

An order was placed for the hardware in February 1980 and for the software the following month. Hardware delivery was scheduled for late April or early May. Instruction began in April at the Prompt dealer's office.

The first sessions were informative, but ultimately disappointing, Freed said, noting that the three people who attended did not feel competent to begin designing anything resembling a system. He said the dealer was not really geared to teaching totally untrained people how to use the Prompt package to develop a system, but was more attuned to supplying prepackaged programs using the Prompt facility.

Freed then learned that the developer of Prompt, Mid-American Control Corp. of Shelbyville, Ky., offered training sessions at its headquarters. "The four-day session really provided the catalyst to make the entire program go for us," Freed said.

After completing the training sessions in July 1980, the Roosevelt staff began entering data on burials with some success. "It was during these early struggles that the Prompt people really came through for us," Freed said. "The ability to fall back on them via phone for answers really made the project a success."

He also cited the flexibility in editing the parameters established by Prompt as a help in speeding the conversion process.

In mid-August, Roosevelt was notified that its local DP facility was changing equipment and would no longer be able to handle its applications by mid-September. With the possibility of finding another facility on short notice doubtful, Freed's staff moved full force into developing the in-house capacity.

"We had no alternative but to succeed," he said, noting, "We had purchased the hardware and software package and had, for all practical purposes, lost our service bureau."

In mid-September the final hardcopy reports were received from the service bureau and Roosevelt gave the tapes that contained its data to the Prompt dealer to be converted to diskettes. Freed's staff began entering customer receipts and, by mid-October, the Prompt dealer entered the converted data into Roosevelt's equipment.

"The conversion had some expected travail due solely to our level of competence," he said, "but, on the whole, it went far more smoothly than I ever expected."

By early January, his staff had successfully completed its annual billing of approximately 5,000 invoices.

The hardware consists of an IBM Series/1 with 128K bytes of memory, 64M bytes of storage, a magazine unit, three terminals and two matrix printers.

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Other problems exist in debugging programs or determining just what system resources programs are using. Who is currently on the system? What programs are executing? How much memory is available? How fragmented is memory? How many TSAs or IRBs is a program using? What size is the sharable portion of a program? What size is the non-sharable portion? How can a user fix a record on any file type that was written incorrectly? How can a COBOL program access the terminal identification for security or other purposes? Can programmers be more productive?

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We also found it necessary to develop a special application called System Control. In this application, we have provided security maintenance, fully functional print spooling to allow forward and back spacing of reports on up to 100 printers simultaneously and complete terminal control. The user must be able to do three things outside of this package:

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Service Quality Improves

City Saves by Ending In-House DP

MONTGOMERY, Ala. — Abolishing in-house DP has saved the City of Montgomery about $100,000 annually. And, much to the surprise of department heads that initially opposed the move, service quality seems to have improved since DP operations were transferred to an NCR Corp. V-8555 computer system under the control of the Mongtomery Water Works and Sanitary Sewer Board.

The board has just two customers — its own departments and the city of Montgomery, according to Willaim L. Oswalt, assistant manager of the water works. Providing DP services to the city was a "natural outgrowth of the board's internal efforts to develop strong DP capabilities to increase its own efficiency in such areas as computer billing and accounts receivable, vehicle and meter maintenance, work scheduling and inventory control," he explained. The board initially offered to share resources and costs with the city six years ago and everyone, including water works customers and taxpayers, have benefited from the change, he said.

"Before we started acting as the city's computer service bureau, it had its own card-oriented computer system," Oswalt recalled. Its batch system handled such basic applications as payroll and business license and assessment processing. "Today, the city has an integrated general accounting system with on-line inquiry and updating capabilities."

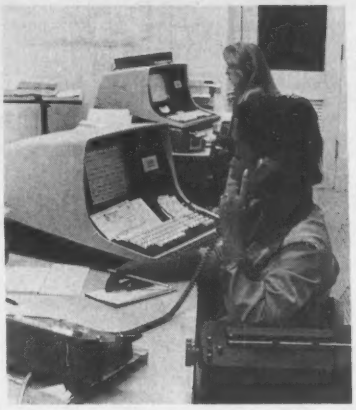
While this new system provides faster access to more information, it costs the city less than the previous one, he continued. Since the decision was made to abolish the city DP department, it has saved in the neighborhood of $100,000 each year, he claimed.

Controversial Decision

The decision to abolish the City Hall DP department was somewhat controversial, Oswalt recalled, because some officials felt that service quality might deteriorate if DP operations were no longer under their direct control.

That fear has evaporated because "we've proven we can provide better service," he said. "Last year, we upgraded from an NCR Corp. Century 200 computer to an NCR V-8555 computer system with Virtual Resource Executive (VRX) operating

(Continued on Page 62)



The water works' Customer Service Department handles more than 35,000 service and collection orders annually. It uses six NCR 796/501 terminals to enter work order requests as soon as problems are reported; queries on account status can be answered while customers are on the phone.

At the Montgomery Water Works' maintenance facility, a clerk uses an on-line NCR 796/501 data entry terminal to update the maintenance work order file as assignments are completed. New work orders are created by the meter reader supervisor or the Customer Service and Engineering Departments.

IBM Enhances Document Unit With In-Line Microfilm, Stamp

WHITE PLAINS, N.Y. — IBM has announced an in-line microfilming feature for its 3694 Document Processor. The feature is located between the main operator console/transport and the stacker modules.

Under program control, both full-function path items (on Models 1 and 2) and sorter path items (Model 2 only) can be recorded on film. Images are recorded in a duplex format.

In addition, IBM has announced a "Paid" stamp feature on the 3694 Model 2. The feature is located on the sorter path and imprints the word "Paid" on a check after the account has been drawn, IBM said.

With the microfilming feature, items are microfilmed as a by-product of transport operations. Sorter path items are filmed on a per-run basis under program control and full-function path items can be filmed selectively, IBM said.

The 3694 item sequence number (12 digits) is recorded on film for every other item. Frame marks are recorded for each item filmed and header information can be exposed on film at the beginning of each frame, IBM said.

Recording density is approximately 13,300 items per 100 feet of film and the reduction ratio is 50:1 with a resolution of at least 110 lines per millimeter, IBM said.

The "Paid" stamp feature is only available on the 3694 Model 2. Stamping occurs on the sorter path at a rated speed of 400 documents per minute for 6-in. documents.

The stamp feature costs $880 or $4 per month, IBM said. The microfilming feature costs $11,500 or $65 per month, IBM said. Both features will be available in October, according to IBM.

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Alabama City Saves by Ending In-House DP

(Continued from Page 61)
software. With our new hardware and software, we can run multiple on-line programs simultaneously. This means there should never by any need to choose between the two organizations in determining processing priorities," he said.

The on-line accounting system and other programs offered to the city work because of the experience gained by the water works staff in developing and modifying programs to meet its own needs, according to William Knight, comptroller and DP manager.

"We simply bring the system up each morning and put files on-line for the city's use," he explained. "They enter data at their own convenience and can obtain hard-copy printouts whenever necessary." Special reports can be requested for next-day delivery, he continued, so there are no backlogs or delays.

Service Center

"We think of our DP department as a service center for two customers," Oswalt said. "With the NCR V-8555's expanded capacity and VRX multiple processing capabilities, the equality of the two customers is never questioned. Sharing computer resources works for us because we have common interests," he said.

Montgomery water works officials believe that the board's successful track record results from its emphasis on up-to-date technology and efficient business methods. The computer expertise it now shares with the city was gained in early automation efforts to improve customer service and cut costs, a spokesman said.

Heavy emphasis has been placed on automation for the last decade, he said. In 1970, the board installed an NCR Century computer system to replace an outmoded card system.

It purchased the NCR machine after a one-year trial period because calculations indicated that it would probably be able to use the computer longer than 44 months — the break-even point in its lease vs. purchase equation. The equipment's actual nine-year life provided value "far in excess of [our] hopes," Oswalt observed.

"But, by 1979 we felt we had to upgrade," he continued. "We saw many advantages in moving to an on-line system and we needed communications capabilities," he said. "The VRX operating software appealed to us because it allowed on-line programming and permitted many programs to be run simultaneously during peak processing periods.

"Though we plan to add many more applications, we think this hardware will meet our needs for at least 10 years."

Saves Time, Money

Knight agreed that the computer system is saving time and money today and that planned enhancements would result in increased benefits. The board purchased on-line software packages for water works utility billing and the city's general accounting system when it upgraded to the NCR V-8555, he said.

"We're gaining on-line experience since the programmers are using VRX on-line programming capabilities to maintain and modify purchased programs," he explained. "Currently, we have a mix of on-line and batch operations with information entered in an on-line environment and file updating usually done in batch mode.

"Eventually, of course, we will have a totally on-line system," Knight maintained. "Our next on-line development effort will be a general accounting system for the water works. This will speed access to information, especially month-end general ledger reports, which now may not be available until the 20th of the following month," he said.

First Application

Utility billing was chosen as the first on-line application, however, because it is a cornerstone for many other programs and board members felt that a good utility billing package would be central to efforts to provide quality service and control revenue, he said.

Some 52,000 accounts are billed on a monthly basis, he explained. The cycle begins with the approximately 2,500 meters that are read each day. After these readings are input to the computer system, a validation run kicks out any readings that extend beyond established parameters.

Bills for these "suspicious readings" are not generated until they can be verified or the discrepancy is resolved. Then, bills for normal readings are generated, he said. The final computer-printed bills include the amount due for both water usage and the city's refuse collection service.

"Savings in postage cost alone are approximately $60,000 annually," he said.

The on-line inquiry capability now available to repair personnel is another example of the system's contribution to operational efficiency, according to Knight.

On-line capabilities are equally important to many other departments and the board and the city have a total of 16 CRT terminals used for inquiry and data entry.

The comptroller maintained that there is no need for computerized forecasting programs to project revenue requirements because system growth is relatively stable and the few variables can be handled easily on a manual basis.

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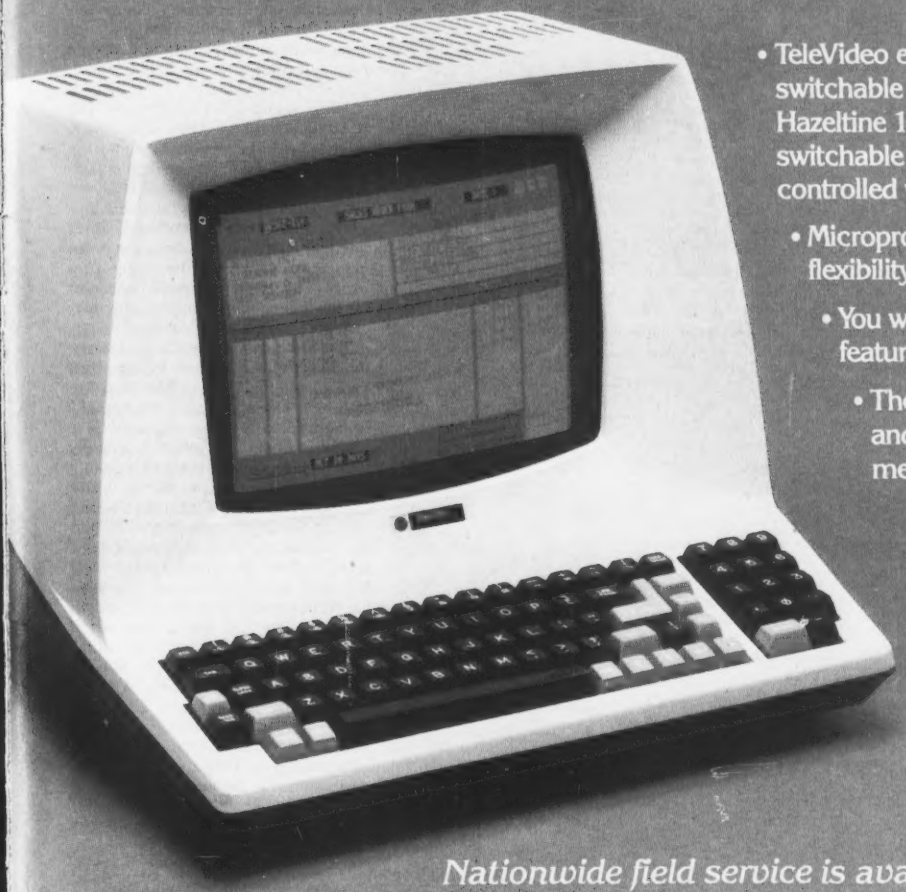

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Digitizers Offer Added Border

AUSTIN, Texas — The Houston Instrument Division of Bausch & Lomb, Inc. has developed a line of digitizers featuring an additional 1-in. border around the specified full active area.

The border was designed to eliminate the waste of active area for user-definable menu selection.

The microprocessor-controlled digitizer features 40 user configuration controls. Standard interfacing includes 8-bit parallel BCD/Binary as well as RS-232C, dual-port serial interface, supporting transmission rates up to 19.2K bit/sec.

Prices start at $2,950 with 30- to 45-day delivery from One Houston Square, Austin, Texas 78753.

Workstation Takes VRF

SANTA CLARA, Calif. — A remote plotting workstation that supports remote job entry, electrostatic plotting/printing and graphics manipulation is available from Versatec.

The Model 444 accepts unsorted vectors in the Versatec Random Format (VRF) as well as sorted vector, compressed raster and raster and print data formats.

Emulating Hasp multileave remote workstations, the system provides IBM software and system protocol compatibility without requiring modification of the operating system.

The workstation costs $35,000, the vendor said from 2805 Bowers Ave., Santa Clara, Calif. 95051.

High-Speed COM Systems Work Either On-, Off-Line

ST. PAUL, Minn. — 3M Co. has announced a family of high-speed computer-output microfilm (COM) systems that produce dry fiche in either on-line or off-line modes.

The 720 series consists of three units that feature microprocessor control, 3M dry-silver film technology and 3M's COM/Quest software. The units reportedly require minimal control from a central processing system and can accommodate wide variations in input and output formats, the vendor said.

3M's 721 system offers single-channel off-line operation, the 722 system features single-channel on-line operation, and the 723 system offers a switchable dual channel for either off-line or on-line operation, the vendor said.

In the 722 system, the 3M channel control unit is a 32K-byte microcomputer that emulates an IBM 2803 or 3803 magnetic tape control unit, communicating directly with a byte or block multiplexer channel or selector channel on an IBM 370 software-compatible processor, the vendor added.

The 721 system costs $97,000, the 722 system costs $95,000 and the 723 system costs $116,000. The vendor may be reached through P.O. Box 33600, St. Paul, Minn. 55133.

Medical Users Gain Graphics

ROCKVILLE, Md. — The Interactive Grafics Digitizer (IGD), a low-cost, stand-alone, turnkey, computer-aided design system designed for small and medium-size graphics data base applications, is being introduced by GTCO Corp.

Using menu-driven software, the IGD allows for graphics data entry, editing, storage, analysis, zooming, windowing and overlaying of images. Applications of the IGD include strip chart analysis, well logging, microscopy, x-ray and other medical data analysis, surveying and mapping. As a graphics input preprocessing system, the IGD can also be used in circuit analysis and mechanical design, the firm said.

The basic system includes a standard GTCO 8080-based Micro Digi-Pad 11-in. by 17-in. tablet and 16-button cursor and two Z80 microprocessors. Also included is a multifunction tabletop console, which offers 96K user-addressable bytes of random-access memory (RAM), two minifloppies totaling 320K bytes of storage, 9-in. CRT and 24 lines with 80 char./line of text, full 128-char. Ascii keyboard and 12-key pad for numeric data entry or function control, four RS-232C ports, four parallel I/O ports and video port for optional printer or monitor.

The IGD's programmable read-only memory (Prom) firmware provides a complete set of interactive digitizing functions, and its Fortran-based computer-aided design Grafics software is capable of creating a variety of vector images, the firm said.

The basic IGD system costs $11,065 from the firm at 1055 First St., Rockville, Md. 20850.

Take a close look.
The VISUAL 200 not only emulates competitive terminals ...it obsoletes them.

The keyboard and rear panel of the VISUAL 200 tell the story. In addition to switch-selectable code-for-code emulation of Hazeltine 1500, ADDS 520, Lear Siegler ADM-3A and DEC VT-52 terminals, the VISUAL 200 has power and versatility they simply can not match. On top of the features in the illustration, other standard features include: 7x9 dot matrix characters with two dot descenders, smooth scroll, tilt screen, self test, dual intensity, blink, blank, line drawing, cursor addressing, read cursor and read terminal status.

And you'll be as impressed with the price as you are with the terminal. So take a close look. Call or write for full details or a demonstration.

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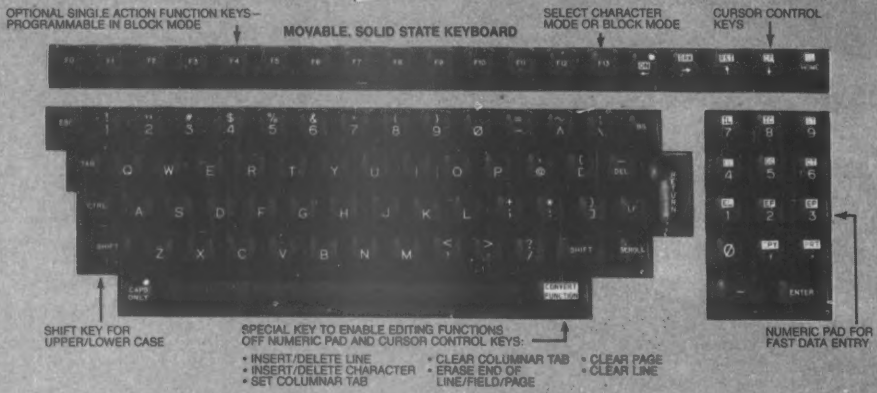
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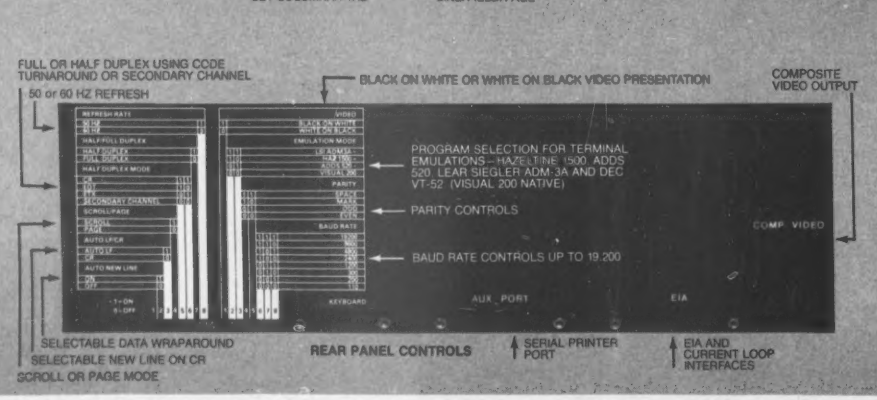
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Microdata Updates Reality, Revamps Systems' Prices

IRVINE, Calif. — Microdata Corp. has streamlined its Reality computer systems line, restructured systems prices and cut the price on its Results software package by 30%.

The Reality minicomputer series now consists of eight instead of 11 models. The reconfiguration means users can upgrade from the entry-level 2510 model to the top-of-the-line 8000 without having to sacrifice the initial processor or applications software, according to the vendor. All components are still compatible with the existing software.

The repricing coincides with recently announced plans to expand Microdata Corp.'s national sales coverage, the vendor said.

Model Prices

The Model 2510 now includes 32K bytes of memory, an 800 bit/in. tape drive, a 15M-byte Reflex disk drive, a 165 char./sec printer and one Microdata Prism CRT terminal. It costs $36,200.

The Model 4510, with 64K bytes of main memory and the same basic configuration as the 2510, costs $42,700.

Model 6750, with 64K bytes of memory, a 1,600 bit/in. tape drive, a 48M-byte Reflex disk drive, a 150 line/min printer and a Prism CRT terminal, costs $52,800.

The Model 8750, with 256K bytes of main memory, a 1,600 bit/in. tape drive, a 128M-byte Reflex disk drive, a 300 line/min printer and two Prism CRT terminals, costs $84,975, the vendor said.

The Results software package now costs $11,300, which is $5,000 less than the earlier price, the vendor said from 17481 Red Hill Ave., Irvine, Calif. 92713.

Multifunction System From Nixdorf Supports DP, WP and Data Entry

BURLINGTON, Mass. — Nixdorf Computer Corp. recently introduced its first multifunction integrated office computer system, designed to support data entry, word processing and business data processing.

The Model 8845 is actually a composite of three previously introduced Nixdorf computers: the 80 series data entry system, the 8840 word processor and the 600 series distributed data processing system. The system is said to combine all of the pertinent features of these three, making them available to a small business or department within a large organization.

Typically, the 8845 consists of a central processor with 128K bytes of memory, a 33M-byte disk drive, eight workstations, three 45 char./sec letter-quality printers, a 165 char./sec serial printer, a 9-track 1,600 bit/in. magnetic tape drive and a back-up diskette.

To facilitate DP functions, the system incorporates Nixdorf's Editor, a high-level business language much like Cobol, which allows users to build, access and update data files. Files can be accessed through partial, full or multiple keys. Like Cobol, the Editor software can be manipulated by the user to generate application programs to tailor the machine to individual requirements.

Data Entry Tool

As a data entry tool, the 8845 has formatting commands and user-friendly prompts that guide operators through the creation of source documents. Data entry can be accomplished in two ways: through a series of frequently used formats that employ standard job procedures or more detailed procedures that specify formats for one-of-a-kind jobs. Once the format has been set and data entry begins, the system reportedly allows the use of more than 15 record format checks and edits to assure that data has been correctly entered.

Data can be accessed using any of the record's fields as keys, he added.

A typical Model 8845 office system costs about $99,480 and is supported by the firm's worldwide service organization. Training is conducted on-site by Nixdorf field specialists, or at a local Nixdorf office or one of the firm's training centers, the spokesman said.

Nixdorf is headquartered at 168 Middlesex Tnpk., Burlington, Mass. 01803.

Processor Field Exchange

Upgrade Package Out for HP CPUs

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a field upgrade package for its HP 3000 Series 30, 33, II, III or earlier processors. The package allows users to upgrade to the firm's top-of-the-line Series 44 processor.

The field upgrade package requires a field exchange of system processors, which HP claims can be accomplished in one working day.

The upgrade includes 1M byte of memory and a new version of the HP Multiprogramming Executive Operating System, MPE IV, HP said.

Further expansion is possible to 4M bytes of main memory with support for up to 1.92G bytes of disk storage and up to 96 point-to-point and multipoint terminals, the vendor said.

Additional Features

In addition, Series III users who want to use the HP 2680 laser printing system or the HP 7976 laser printing system may do so with an intelligent interface module for the Series III, the vendor said.

Those users can also use forms design, special character sets and logo design capabilities of the laser printing system, the vendor said.

The HP7976 magnetic tape subsystem, which offers both 6,250- and 1,600 bit/in. tape densities, combines software, firmware, and electronics to back up data from a disk at a rate of about 400M bytes per 30 minutes, according to HP.

System processor upgrades to the Series 44 start at $45,853 for the Series 33 and $41,240 for Series III systems.

The upgrade package for the Series II starts at $56,755, according to HP.

The vendor is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Entry-Level Desktop Debuts From Mohawk Series 21 Line

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. has announced the System 21/10, an entry-level desktop computer system that is part of the firm's Series 21 line.

The 21/10 is comprised of a controller console/CRT with 96K bytes of memory and a communications controller.

One diskette drive and a display screen with a movable keyboard are integrated in the keyboard as standard hardware.

A second diskette and a choice of a 45 char./sec letter quality or a 120 char./sec matrix printer are optional, the vendor said.

Turnkey Support

System 21/10 supports MDS-supplied turnkey programs such as word processing, extended data entry and utility programs, as well as previously compiled, user-written Cobol or Mohawk Business Oriented Language (Mobol).

The system also supports asynchronous and binary synchronous communications including 3270 dialogue, at speeds up to 4,800 bit/sec, Mohawk claimed.

System 21/10 is capable of processing two separate jobs concurrently, the vendor spokesman said.

The System 21/10 costs $7,035 or $175/mo on a five-year plan. Monthly maintenance is $73/mo the system will be available in the fourth quarter of 1981, the vendor said from 7 Century Drive, Parsippany, N.J. 07054.

A Mini Is a Mini Is a Mini — Or Is it?

A minicomputer is a minicomputer is a minicomputer.

Or is it?

While most of today's minicomputer-based systems are small enough to fit into the corner of a room, they are also capable of packing a data processing wallop as powerful as any of the big mainframes.

And what the smaller minicomputers lack in memory size and processing speed, they more than make up for in communications and peripheral flexibility.

Where, then, does one draw the lines between the mini, the supermini and the mainframe? Have minicomputers taken that inevitable step and become what every good little computer someday hopes to be — an honest-to-goodness, tape-spinning, number-crunching mainframe?

Computerworld will be hot on the trail of the multitalented mini in a Special Report scheduled to be published this July. In the report, a variety of industry experts, players and pundits will offer their views on minicomputers. The report will also show who is using these machines, why they are using them and how they expect to keep ahead of the technological tide.

If you have an interesting story to tell, an idea to explain or a minicomputer philosophy to tout, *Computerworld* would like to hear from you.

Stories should be a minimum of four and a maximum of six double-spaced typewritten pages. Charts, graphs, diagrams and pictures are welcomed.

Articles should be sent before June 15 to Senior Editor Tim Scannell, *Computerworld*, Box 880, Framingham, Mass. 01701.

NEC Desktop Micro Supports Multiple Operating Systems

LEXINGTON, Mass. — NEC Information Systems, Inc. has announced a desktop microcomputer system, the PC-8000, that supports multiple operating systems, programming languages and a variety of peripherals.

The desktop unit houses a Z80 processor, up to 64K bytes of dynamic read-only memory (ROM) and an optional 32K bytes of ROM, 320K bytes of disk storage and a combination keyboard and display unit, the vendor said.

The unit can be used by small businesses for word and data processing, as a remote terminal and a stand-alone decision support system, according to the firm.

The computer uses an 80-col-by-25-line CRT terminal, which is available in either green monochromatic or an optional eight-color version. An 82-key keyboard includes a standard typewriter format as well as a numeric pad and five dual-level programmable function keys, the vendor said.

A second 320K-byte dual diskette unit can be added when more storage is required, and magnetic tape cassette storage is also available.

A typical configuration costs $3,700, the vendor said from 5 Militia Drive, Lexington, Mass. 02173.

Shared Processor Allows Simultaneous Operations

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. has announced a shared processor system that allows five workers in the same office simultaneously to perform data and word processing on individual CRT terminals.

The 5005 Multi-Share System employs a Z80 microprocessor with a 5M-byte 5.25-in.Winchester disk, a 630K-byte floppy disk and an error-correcting disk controller, the vendor said.

Up to five users can reportedly combine almost any mix of applications. For example, Vector's Memorite III word processing package and Execuplan financial planning software can be executed simultaneously by two or more users. Similarly, up to five different accounting functions — accounts receivable, accounts payable, billing and so on — can be performed simultaneously by different users, the vendor said.

The 5005 can support two printers, one with a serial interface and one with a parallel interface unit. The error-correcting scheme on the 5005 is the same as used on Vector's smaller 3005 systems, according to the vendor.

The 5005 is based on IBM-type technology, and error correction is implemented through a proprietary Vector Dualmode board that corrects up to five erroneous bits in every 256 bytes, according to the vendor.

The 5005 costs $8,995, the vendor said from 31364 Via Colinas, Westlake Village, Calif. 91362.

Disk Controller Fits PE OS/32, OS/16

ANAHEIM, Calif. — A single-board disk controller said to control up to four disk drives for Perkin-Elmer Corp. OS/32 and OS/16 operating systems has been announced by Macrolink.

Dual port drive compatibility enables interfacing any or all drives with two different computers, the vendor said, and the controller's half-word data transfer runs with both standard and alternate protocols.

The Macrolink disk controller is priced at $3,900 from Macrolink, 1150 E. Stanford Court, Anaheim, Calif, 92805.

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A FRANCHISE OPPORTUNITY

• CII-Honeywell Faces Possibility Of Nationalization

By Graham Bunting
Special to CW

MINNEAPOLIS — Following the recent election of Socialist leader Francois Mitterrand as the new president of France, there is a strong possibility that CII-Honeywell Bull (CII-HB), Honeywell, Inc.'s joint-venture company in France, will be nationalized.

However, the nationalization of CII-HB, although part of French Socialist Party policy, is by no means a foregone conclusion. First the Socialists will have to be successful in their election to the French parliament — an event that will occur within two months. At present, Mitterrand does not have a majority in the French National Assembly.

"I think it would be a great mistake for the French government to nationalize CII-HB," Edson Spencer, Honeywell's chairman and chief executive officer, said here last week. "They would eliminate their overseas partner [Honeywell] in the process and they will be on their own technologically."

(Continued on Page 70)

• ICL Rebuffs Overtures Made By Univac, CDC

LONDON — ICL Ltd. recently rejected joint-venture overtures from Sperry Univac Corp. and Control Data Corp., preferring instead to shore up its troubles by realigning its top management and using the $564 million credit line recently arranged with UK banks.

That credit line is backed up by about $420 million in government loan guarantees.

ICL replaced both its chairman and managing director. Taking over as chairman is Christopher Laidlaw, who formerly served as deputy chairman of British Petroleum Ltd.; he replaced Philip Chappell.

Assuming the position of managing director is Robert W. Wilmot, who most recently was managing director of Texas Instruments Ltd. He succeeded Dr. C.M. Wilson.

Commenting on the joint venture proposals, which surfaced publicly early this month, Laidlaw said this venture was not an acceptable arrangement for ICL's shareholders, customers and em-

(Continued on Page 70)

Mainframers Lose Ground
Federal CPU Inventory Up

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — While the federal computer inventory grew 5.6% last year, from 14,333 to 15,142 CPUs, major mainframers continued the recent trend of losing ground to small systems vendors in government sales, according to the General Services Administration (GSA).

Statistics compiled by GSA's Automated Data and Telecommunications Service (ADTS) for publication next month indicate IBM's share of federal mainframes dropped to 8.3% from last year's 9%, a continued decline from the 42.3% federal market domination it enjoyed in 1965.

The fiscal 1980 figures also show Burroughs Corp. represented with 305 mainframes (a 2% share of the federal market, down from 1979's 2.2%), Control Data Corp. having supplied 462 CPU's (3% of the total, down from 3.5%), Honeywell, Inc. with 912 machines (6%, down from 7.3%) and Sperry Univac with 1,793 units (11.8% vs. the previous year's 14.4%).

For the first time the ADTS statistics list units delivered by Wang Laboratories, Inc., which now accounts for 2% of the federal inventory of CPUs with 306 computers. Xerox Corp., which still had 297 mainframes listed last year, was dropped from the individual statistics.

In line with recent trends, Digital Equipment Corp. continued to dominate the federal inventory, in numbers of CPUs at least, with 4,000 mainframes supplied — a 26.4% market share, up 1% from 1979's 3,656 unit total. Similarly, Data General Corp., Hewlett-Packard Co. and Modular Computer Systems, Inc. increased their federal market shares with unit totals of 1,122, 1,214 and 629, respectively.

CPU Categories

According to ADTS, of the 15,142 CPUs owned and leased by federal agencies, 5,639 were "general management" and the remaining 9,503 were "special management" computers. The latter category describes machines used for classified purposes, for process control or on board ships and planes.

The 15,142 mainframes, configured into 11,055 systems, were given a total dollar value of $1,915 billion, a decrease of $28 million from the fiscal 1979 figure.

GSA valued the government computer systems, mainframes and peripherals, at a total of $5.54 billion, up $53 million from the previous year. Although the large mainframers continued to lose ground in

(Continued on Page 68)

Bay Area Vendors Gearing Up For Expected Surge in Graphics

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — Vendors in San Francisco's Bay Area are flexing their muscles for what they anticipate will be a big surge in demand for computer-based graphics products over the next few years.

As data processing and management information systems (MIS) managers strive for new ways to improve lagging productivity, these vendors believe that graphics will come to be seen as an increasingly useful way to assimilate information and determine quick courses of action.

Universities, governments, oil companies, natural resource exploration projects, medical, aerospace and cartography applications have all been penetrated by the use of graphics over the last few years. As technology continues to decrease costs, their use is expected to expand still further.

Chris Rook, technical sales manager at Cromemco, Inc., a Mountain View, Calif., manufacturer of general-purpose microsystems, summed up the general feeling: "If you take the area of process control, for example, it is obvious you can get a lot more information onto a single picture than you can on a chart."

Software Key

Cromemco, which specializes in graphics for the communications and broadcast industries, aims to provide the hardware and software tools for users. "The market today is looking for easy-to-use software tools that can be used to create images and to use them extensively. The key to who is going to be successful in this industry is the software," Rook added.

In an attempt to capture a slice of this market, Cromemco introduced a software application package at the National Computer Conference in Chicago, to be used in graphic presentations. The package has the ability to store and retrieve images in random fashion and includes a zoom facility, Cromemco said.

There is now no doubt that graphics has passed the hobbyist stage and is being

(Continued on Page 72)

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W 106

After Bail-Out by Datapoint

Inforex Trims Sails, Sees Profit on Bottom Line

By Marcia Blumenthal
CW Staff

BURLINGTON, Mass. — Bailed out of bankruptcy when acquired by Datapoint Corp. eight months ago, Inforex has trimmed its sails by introducing a new system and by contributing $1 million to its parent company's bottom line last quarter.

Inforex, a high flyer during the mid-1970s and well known for its data entry and file management products, ran aground and declared bankruptcy in October 1979. Inforex is now housed in the modest quarters once used exclusively for manufacturing, with the plusher former corporate headquarters leased to another firm.

In the months since last September's acquisition, Inforex has concentrated on nurturing its user base by offering software enhancements and by cleaning up its finances, John L. Hale, company president, noted during a recent interview here.

Although Inforex had a solid reputation and 4,000 systems installed, the firm suffered a setback after it introduced its 7000 distributed data processing system.

The product took too long to bring to market — more than two years — and was never delivered with the features that were advertised, Hale explained.

9000 System

By contrast, the new 9000 system introduced earlier this month took only seven months to reach the market [CW May 11].

Although the 9000 is a distributed data processing system, it is heavily oriented toward data entry and file management, outfitted with sophisticated software for those tasks.

Inforex will continue to offer products that enhance Datapoint's product line, Hale said, adding that right now most of Inforex's research and development is done with the parent firm. The processor for the 9000 system is a Datapoint-developed unit.

Based on feedback from users, Inforex will be adding more source data entry capability. In the past, the firm's products were for volume data entry.

Since taking over the leadership of Inforex, Hale, who was vice-president of field operations at Datapoint, has instituted incentives for users to purchase or convert their systems. In the future, the firm will continue to strike a balance between purchase and lease, with Inforex rather than third parties holding the leases.

While not exactly cash rich, Inforex managed to contribute more than $1 million to Datapoint's second-quarter earnings.

One of the reasons Datapoint acquired Inforex was for its international marketing expertise — some 50% of the firm's products are sold in foreign markets. Datapoint has since acquired TRW, Inc.'s international distribution arm. [CW May 4].

Moreover, Inforex has good representation among Fortune 500 companies, a prime target of Datapoint, Hale noted.

With its new product on the market and its financial picture more secure, Inforex is actively recruiting personnel, both technical and marketing.

Hale reported the firm is not experiencing difficulty recruiting new personnel, although some prospective employees are skeptical.

Inforex recently stopped paying incentive bonuses to employees who stayed with the firm during rough times.

Personal Computers Get Own HP Group

PALO ALTO, Calif. — Hewlett-Packard Co. has granted product-group status to its personal computer and hand-held calculator products.

The move places leadership for these proucts under a single management team, putting the group on an organizational par with HP's other product groups.

Heading the Personal Computer Products Group is C.R. Moore, who will also continue as general manager of HP's Corvallis Division. He will report to Dean O. Morton, executive vice-president.

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Major Vendors Lose Ground To Small Systems Houses

(Continued from Page 67)

the number of units supplied, they remained the government's leading suppliers in terms of dollars.

IBM machinery continued to represent the largest single dollar figure with $1.352 billion worth of equipment (55,680 units) supplied to the federal government. The company was followed by CDC with $739 million ($25,100 units), Univac with $744 million (26,140 units), Honeywell with $522 million (23,800 units) and Burroughs with $281 million (17,020 units).

Other figures for total components dollar value were DEC, $271 million; DG, $44 million; HP, $68 million; Modcomp, $40 million; and Wang, $18 million.

I/O Units

Along with the mainframes, the fiscal 1980 federal inventory included 77,157 I/O units (valued at $968 million), 62,523 storage units ($1.836 billion), 79,931 communications terminals ($485 million) and 57,940 "other components" worth $343 million.

IBM was the main supplier of I/O devices with 10,515, followed in order by Univac (7,120), Honeywell (6,158), CDC (6,002), Burroughs (5,071) and DEC (5,321).

IBM was also the leader in storage devices, accounting for 8,001 federal units, followed by Univac (7,251), CDC (6,933), DEC (6,498), Honeywell (6,432) and Burroughs (3,434).

In communications terminals Honeywell led the pack with 10,342, followed by CDC (8,966), Burroughs (7,069), Univac (5,373) and IBM (3,808).

Fiscal 1980 Highlights

Other highlights of the fiscal 1980 ADTS figures were:

• Annual federal expenditures for data processing activities totalled an estimated $5.127 billion, up $363 million (a 7.6% increase) from fiscal 1979.

• Confirming the well-recognized problem of a rapidly aging equipment inventory, the ADTS statistics show 9.8% of the federal mainframes were 12 years old or older as of Sept. 30, 1980. This compares to a figure of 8.5% the previous fiscal year.

• While the federal gopvernment continued to purchase over 90% of its CPUs, it leased almost half of its peripheral devices.

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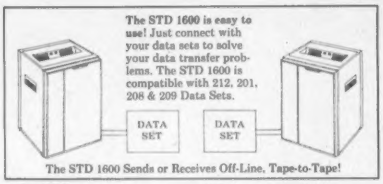
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IBM Names Three Fellows For Technical Contributions

NEW YORK — Three IBM employees were honored for outstanding technical contributions and were appointed to the company's Fellows Program at an awards dinner held here recently.

Noting achievements ranging from semiconductor manufacturing and packaging to communications system architecture, IBM President and Chief Operating Officer John R. Opel named Dr. Donald P. Seraphim, Dr. Edward H. Sussenguth and Dr. Janusz S. Wilczynski to the program that began in 1963.

The Fellows Program recognizes IBM engineers, programmers, scientists and other technically oriented personnel and allows members to pursue scientific and technical projects on their own for five years.

An appointment as a Fellow frees the employee from most of the usual checks and balances of organization structure, IBM noted. In addition, the Fellow acts as a consultant to the company's other scientists and engineers and is allowed to receive financial and staff support for his projects.

Seraphim, of IBM's System Products Division, was cited for his technical contributions to packaging technology for integrated circuits, and IBM noted his earlier work in field-effect transistors, which the company says still provides the basis for IBM's implementation of that technology.

Contributions to systems architecture in early high-performance computers highlighted Sussenguth's accomplishments, along with more recent developments in communications systems, including IBM's Systems Network Architecture. Sussenguth works at the company's System Communications Division.

Achievements Noted

IBM said Wilczynski, of the Thomas J. Watson Research Center, is noted for achievements in designing optical components for semiconductor fabrication processes. In addition, his accomplishments include development of high-resolution, step-and-repeat cameras that demonstrated line widths on the order of one micron could be produced, the company stated.

Since the inception of the program in 1963, 77 Fellows have been appointed and are currently active, according to IBM.

The three new fellows are credited with a total of 65 patents, patent applications and invention disclosures, IBM said.

CII May Be Nationalized

(Continued from Page 67)

He suggested that this would lead to "CII returning to a loss-making situation in the long term."

Following the election, the French stock market was swamped with sell orders, with some stock prices reportedly dropping about 20%. Compagnie des Machines Bull, the holding company for CII-HB, was said to be one of the heavier losers. Although panic selling seemed to abate as the week wore on, investors were wary that the Mitterand government portends a restrictive business climate, increased taxes and inflation.

Should CII-HB be nationalized, Spencer noted, Honeywell's "shareholders will be protected under the agreement which set up the joint-venture company and to which the French government of the time was a party."

This agreement also allows for the negotiation of an ongoing relationship between a nationalized CII-HB and Honeywell, but "how this would develop would depend on how the nationalization was carried out," Spencer commented.

Shared Technology

In any case, both CII and Honeywell would continue to have rights to their shared technology.

CII could manufacture the larger systems currently not made in France, and, conversely, Honeywell could manufacture the mid-range system that is now made exclusively by the French company.

Presently, Honeywell holds 47% of the joint-venture company. Another major shareholder, St. Gobain, is also a target for possible nationalization.

Bunting is editor of Computerworld UK.

ICL Rebuffs U.S. Firms

(Continued from Page 67)

ployees.

"This is particularly true in relation to the retention of significant research and development and manufacturing facilities in the UK and also to the safeguarding of past and future customer investment in ICL products."

Laidlaw noted that ICL has had links with other manufacturers in the past, particularly for the supply of peripherals. He said collaborative ventures would be part of the company's strategy over time.

Commenting on the termination of the joint-venture talks, Sperry Chairman J. Paul Lyet said that under such an arrangement, ICL might have had to lay off nearly double the number of workers as might prove necessary if it remains unaligned. He noted that ICL was prepared to lay off 1,500 workers. Lyet estimated ICL may have to lay off those 1,500 workers anyway, because its overhead is too high to support the current level of business.

In Britain, an ICL official corroborated Lyet's assumptions on layoffs, but would not provide any details of the number of work force reductions that will be made or when such reductions would occur.

During the fourth quarter last year, ICL reported a $42 million loss. Its annual sales are in the $1.5 billion range.

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High Costs, Slow Growth Cited

Memorex First-Quarter Loss Hits $7.2 Million

By Robert Batt
CW West Coast Bureau

SAN JOSE, Calif. — Despite record first-quarter revenues and strenuous efforts to improve efficiency and cut costs, the troubled Memorex Corp. has posted yet another loss, shareholders were told at the company's annual meeting here recently.

Clancy Spangle, chairman and chief executive officer, blamed high manufacturing costs, slower growth than anticipated and the economic recession for the company's woes. For the first three months of 1981, Memorex lost more than $7.2 million on revenues of $191.35 million, compared with a profit of $1.106 million and revenues of $184.8 million in the equivalent period last year.

Addressing the shareholders, Spangle said achieving consistent profitability was the No. 1 problem facing the company if it was to remain a force in the data processing field.

"One key thing Memorex has not accomplished is consistent profitability. It has been profitable in 13 of its first 20 years, but Memorex does not, [and] never has had, one or two high profit businesses which could shelter losses from others or major start costs," Spangle said.

Spangle argued that what Memorex needed was one or more businesses that were consistent profit makers if it was to fund the research and development required to continue in high technology and have the freedom to go into new business areas and take advantage of new opportunities available.

Problems Converge

Spangle said a number of problems had converged to plunge Memorex into its present difficulties. Among these was the fact that expenses were growing more rapidly than revenues and that negative cash flow was high.

"We found that the business had developed an overhead structure that was inadequate to support a growth in the several businesses in which Memorex was participating. We found that a number of product lines and certain businesses were unprofitable and using cash. Further, manufacturing costs and inventories were too high, particularly on our largest volume product — our end-user disk drives," he added.

The chairman told stockholders that the company had taken a number of measures throughout the last 12 months in an attempt to correct some of the problems. These included reducing the work force by 1,500 (although, he conceded, some areas were still overstaffed); ending leases to customers of non-Memorex equipment such as tape drives formerly brought in from Fujitsu Ltd. and printers from Control Data Corp. (CDC); and the stoppage of sales in certain products, such as semiconductor memory products and older computer equipment, where, in the company's opinion, such sales could not be made profitable.

But Spangle admitted that despite this medicine, the patient was far from cured. "All of us are somewhat frustrated by the fact that the improvement in the company's performance is taking longer than it should. We have made a number of changes, some of which have been very beneficial; others have resulted in disruption and turmoil, which has not been beneficial," he said.

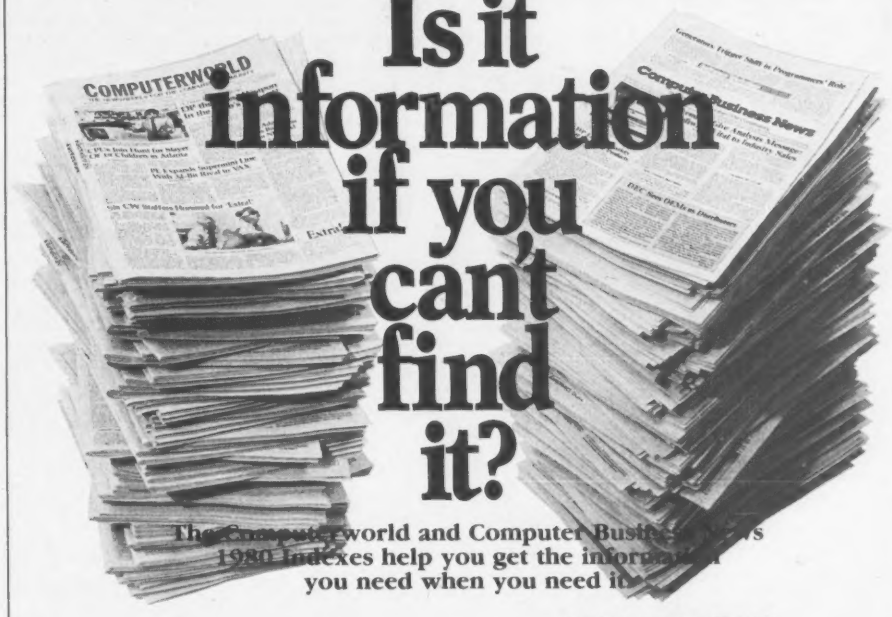
Although Memorex had achieved cumulative cash flow since July 1980, profits continued to lag. Inflation, high interest rates and weakening foreign currencies, had, according to Spangle, continued to hurt the company. Although Memorex had made price increases, he said they had not been sufficient to offset inflation. In addition, with long-term debts of $182.89 million, interest rates were proving a severe problem and, with half of Memorex's business based overseas, weakening foreign currencies had also directly impacted profitability.

Turning to the problem of high manufacturing costs, Spangle explained that the company was having trouble getting high enough yields on certain components to support the planned level of production. Yield is a way of expressing the amount of a product that, after being put through the production process, winds up being an acceptable product.

He told shareholders: "Because of cash constraints, we did not want to produce large numbers of disk drives for the rental base. Therefore, we reduced the level of production of large disk drives last summer. This reduction meant that our costs rose.

"These problems have continued and, while we are now making progress in improving the yields of critical components, we still have a much higher rate of scrap rework costs and inventory charges than desirable."

Nevertheless, Spangle was upbeat about the company's prospect, saying that the remainder of 1981 would show an improvement over the first quarter, though he refused to forecast a profit.



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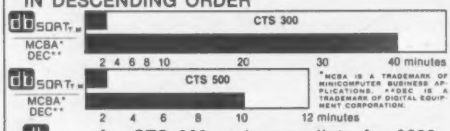

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Bay Area Vendors Gearing Up For Expected Surge in Graphics

(Continued from Page 67)

seen by DP and MIS managers as a potent commercial tool. Apart from its obvious use in presenting models of information such as financial results, graphics is expanding into other less well-known areas such as in the scientific arena for use in processing scientific studies and presenting results, and in broadcasting.

Edward J. Morton, director of marketing for International Image Systems (IIS), said that graphics and image processing were increasingly being seen by users as a useful way of looking at data repeatedly and of updating it.

"Areas showing new growth include the nondestructive test area and intelligence-gathering operations, animated digital displays and medical diagnosis. In all these areas, image processing is proving to be a good quantifiable tool," he said.

Technology Dependency

Many vendors feel their ability to penetrate growing markets depends, to a large extent, on developments in chip technology and a consequent reduction in prices. As the ability to pack more functions onto a semiconductor device grows, so the use of graphics in areas of manufacturing such as process and production control will increase.

"Undoubtedly the biggest market for graphics will be in increasing production in areas such as primary engineering and manufacturing companies, banks and accounting," Corley Phillips, product manager for Hewlett-Packard Co.'s Data Systems Division, said.

"Our aim is to be the computer company for manufacturers, with many of our customers being in the DP divisions of large engineering and manufacturing companies, particularly those involved in discrete manufacture. The basis for increasing use of graphics depends on continuing the rapid decline in the costs of computer systems and that requires putting more smart chips into peripherals," he added.

Three Concentrations

HP has concentrated its attention on graphics applications in three main areas:

• Data display graphics — line, bar and pie charts to enable managers to come to grips with production and sales figures. An automobile manufacturer, for example, uses a desktop computer to analyze fuel/air ratio and catalytic converter temperature traces that are created during engine transmission monitoring. The analog traces are input to the computer via a digitizer, the system analyzes them and outputs a plot to a peripheral plotter.

The plot indicates the effect of air/fuel ratio changes on converter temperatures and shows how long the catalyst can remain at a certain temperature before burning out. HP maintained that the use of graphics in this way has reduced the time needed to perform the operation by more than 60%.

• Real-time display graphics — used for monitoring, modeling or simulating an object or situation, such as in plate line processing or high-speed radar tracking.

• Design graphics — used in such applications as printed circuit board design, aircraft design and analyses and civil engineering.

Interactive Graphics

"We intend to get much more into interactive graphics than we have to date, particularly in areas such as high-resolution displays, application packages, programs and software.

The operator has to interact with the system, this is where graphics comes into its own and our goal is to use our systems throughout the whole area of computer-aided manufacture, including the design, testing, documentation, assembling and monitoring of a product," Phillips said.

Many of the major graphics vendors expect significant developments in the area of computer-aided design and manufacturing (CAD/CAM) over the next few years. Systems are expected to become faster, more distributive and contain more user-oriented software.

The menu system, that is, having all the data in a tablet form, is expected to become more popular, resulting in such features as high-resolution displays, dynamic pan and zoom facilities and less flicker on the screen.

"We feel the emphasis has to be on turnkey systems because many users now want menu-oriented, command-oriented, integrated systems. They do not want to be burdened with computer technology," Morton said.

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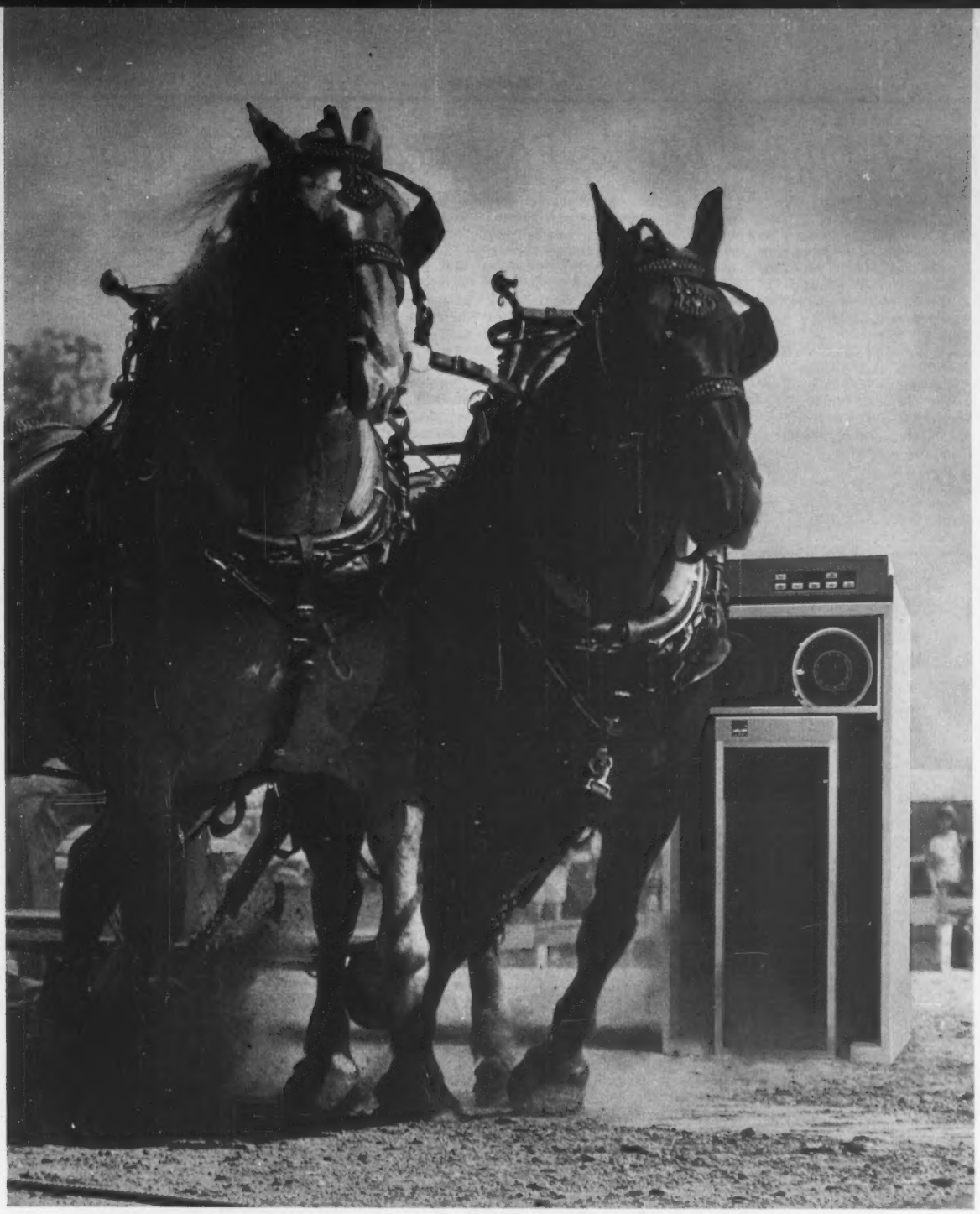

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TRW-Fujitsu Marks First Year With Show of Gear

By Susan Coleman
Special to CW

CHICAGO — Just a year after its entry into the U.S. data processing market, Fujitsu Ltd., via its joint venture company TRW-Fujitsu Co. (TFC), showed its wares at the National Computer Conference held here recently.

Although the company has yet to install any of its small business systems, TFC claims to have about 12 orders for the TFC 8500 (known elsewhere as the V series).

The 8500 comes in four models, starting as low as $22,000 (for 256K bytes of central memory, a 25M-byte hard disk and a console).

The Facom M series is yet to be released in the U.S.

"The plug-compatible market here is very crowded already. It seemed more sensible to attack the small end of the market first," the spokesman said.

TFC has identified two markets for the TFC 8500:

- The business with a revenue of $10 million or less, typically a first-time user.
- The distributed processing market that involves targeting very large companies.

With a present employee base of 850 people, drawn mainly from TRW (manufacturing and market support), TFC is reportedly very well set up to hit the market hard and fast.

It will sell by direct approach, to first-time users — in manufacturing and distribution initially — with a packaged product of applications software and hardware.

"So far, we have not addressed this packaged solution market. We're waiting for the development of suitable software products," the spokesman said. These were expected to be ready in the fourth quarter.

Accent on DDP

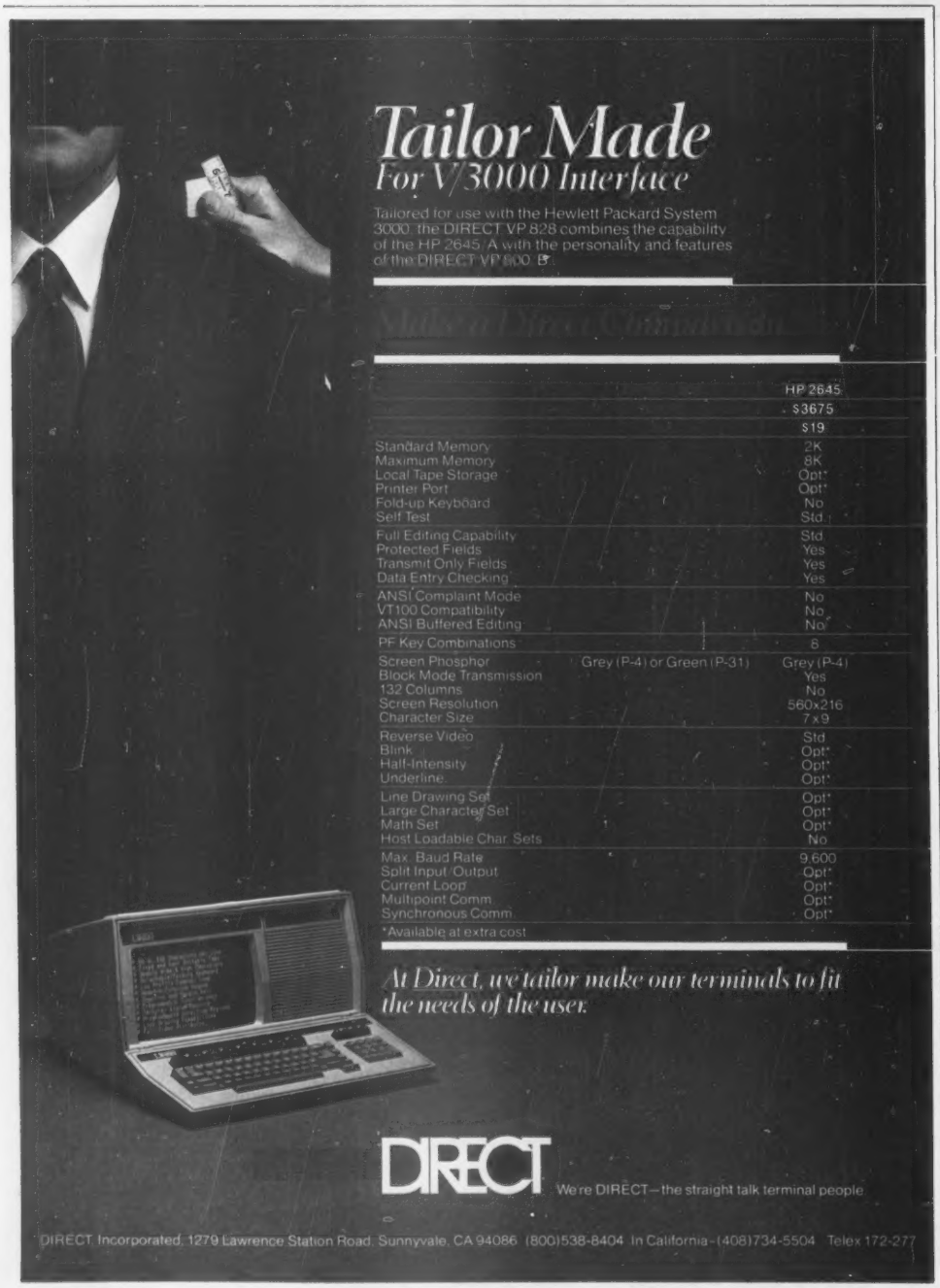
Until this packaged software is available, the company is concentrating on selling DDP systems. "These sophisticated users are prepared to write their own applications software," the spokesman said. The 8500 supports IBM's Systems Network Architecture networking software, but not X.25, which is still under development by Fujitsu.

At NCC, TFC also displayed its new large-capacity 8 in. Winchester-type disk drive, the M2312K, and a mini disk drive, the M2351A.

Fujitsu is approaching the U.S. market on several fronts. Some of its computer products are offered through Fujitsu America, Inc. (FAI) of Santa Clara, Calif., a wholly owned subsidiary established in 1971. Other computer products are sold directly to Amdahl Corp. of Sunnyvale, Calif., in which Fujitsu has approximately 30% interest.

Fujitsu also established Fujitsu Microelectronics, Inc. in California as a semiconductor marketing and manufacturing organization. A semiconductor manufacturing facility began operations in San Diego in 1980.

Fujitsu is involved as well in the office automation field in the U.S. The Word Machine, a mainframe-based word processing system that had been under development by DPF, Inc., of Hartsdale, N.Y., was acquired by FAI.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Executive Corner

- Robert Nadal has been named vice-president of sales for Northern Telecom, Inc.'s Electronic Office Systems, western region.
- Robert L. Puette has been named general manager of the General Systems Division at Hewlett-Packard Co. Michael C. Leavell has been named general manager of the Computer Support Division.
- John C. Scott has been named manager of data processing for International Commercial Center.
- Rolf E. Westgard has been named general manager of the Business Communication Products Division at 3M Co.
- Bernard Horn has been appointed vice-president and general manager of the Supplies Business Group at Diablo Systems, Inc.
- Ron Baldwin and James Rice have been appointed vice-presidents at Data Lab Corp.

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TRW, Fujitsu Joint Venture

TFC Still Unknown Quantity After First Year

By Robert Batt
CW West Coast Bureau

LOS ANGELES — Just one year after its formation, TRW-Fujitsu Co. (TFC), the US-Japanese joint venture, is still very much of an unknown quantity.

Despite the backing of two huge conglomerates, TRW, Inc. and Fujitsu Ltd., and with a stated intention to become a $1 billion company within 10 years, TFC's first year has been largely characterized by a deafening silence as managers from both companies strove to consolidate their newly formed venture into a coherent whole.

But signs of activity are at least beginning to emerge and the second half of 1981 seems destined to see a far more aggressive posture from TFC with several ideas already in the pipeline.

Among the projects now being considered are:

- The introduction of a remote communications desktop computer to be announced this summer and designed to lock into MVS and other operating systems. Applications will include real estate network data banks and sales order entry housed in a host computer.
- A major thrust into the fast-growing retail market through its 7780 point-of-sale (POS) terminal designed for speciality and department stores.
- Complementary to this, TFC plans to announce a new 1100 small batch computer at next month's American Banking Association (ABA) show in New Orleans. This device will be designed to drive POS terminals and, according to the company, will be the first in a series of high transaction-oriented computers.

Initial Capitalization

TFC has an initial capitalization of around $75 million and aims to compete in four main areas — small business systems, distributed and networked systems, retail equipment and financial systems.

In its first year of operations, the joint venture has experienced some teething troubles, chief of which has been communication between its U.S. and Japanese arms. "One of the toughest tasks has been to coordinate activities with Fujitsu, which is not a monolithic corporation and takes a long time to finally arrive at a decision on, say, a new product," noted Garrett Fitzgibbons, vice-president and general manager of TFC.

The company does not expect to be profitable for two to three years and, according to Fitzgibbons, there is a long haul ahead. "We are like a large airplane. We have left the gate, but have not yet reached the end of the runway and have certainly not taken off."

Slow Progress

He added: "We have not yet moved ahead in the financial area as aggressively as planned. TRW's ability to express the requirements of the U.S. market to Fujitsu has not been as efficient as it should have been and the products have been delayed. Likewise, progress on the M series has not been as quick as it should have been.

"Fujitsu has not committed itself to the product in the U.S. in the way it needs to if it is to be successfully marketed here. Given the downturn in the market, this might turn out to have a useful thing."

Fitzgibbons said that the TRW arm of the joint venture was faced with having to perform a lot more work on Fujitsu products, particularly in the area of documentation, than had been anticipated. "Fujitsu gives us an insight into its development plans as they impact our requirements, but they are not completely open with us. Building confidence between us has not been as quick as we had hoped, and although the relationship is growing there is still a long way to go," he said.

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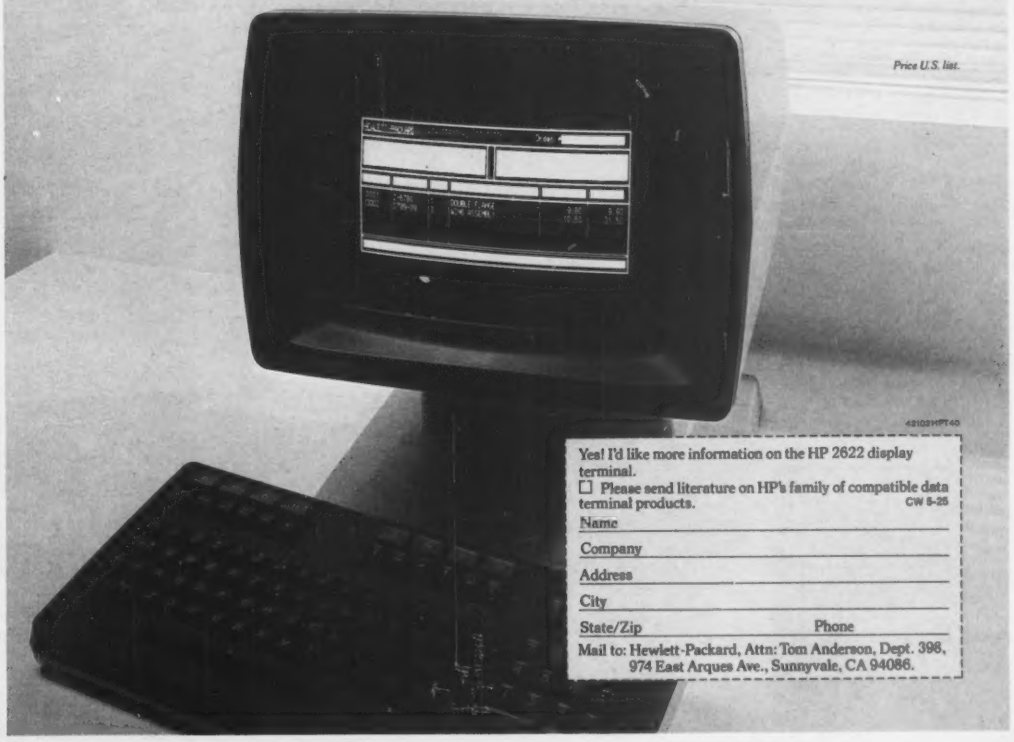

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Reflecting Growing Trend

Four-Man Firm Making Mark With Compilers

By Susan Coleman
Special to CW

BELMONT, Mass. — A four-man software company is successfully penetrating the systems software domain of hardware vendors with a family of compilers for 16-bit and 32-bit computers.

While manufacturers prefer their users to think that they write all their offerings themselves, there is a growing trend to go to such specialist software houses for better performance products.

"Three out of the six largest U.S. minicomputer manufacturers offer our compilers as part of their standard software," said Michael Schwartzman, president of Language Processors, Inc. (LPI).

The company has recently delivered an RPG-II compiler for Prime, Inc.'s 50 series of computers, which, it is claimed, produces programs that run six to 10 times faster than Prime's own offering and two to four times faster than a new Prime compiler that is being field tested now. LPI was commissioned to produce RPG-II by a software house in Australia that is planning to sell the product to Prime distributors worldwide in competition with Prime's own replacement product.

Performance Test

The performance results were obtained on production programs supplied by Prime Computer of Australia and Prime, Inc., which ranged from several minutes to an hour in running time, according to Prime Australia's managing director Lionel Singer.

"While a fast compile time looks good in a demonstration, it is the speed of execution of the compiled program that is most significant in the production environment," Singer said.

"We commissioned LPI to produce a compiler to very tight performance specifications with this in mind."

Architectures that already have one or more LPI compilers running on them include IBM/370, Data General AOS Eclipse, AOS/VS, MV/800, Digital Equipment Corp. Vax-11 series, IBM Series/1 and Motorola Corp. 68000.

Field Use

"Every compiler of the family is in the field being used," Schwartzman said. He claimed most of these compiled at 2000 source line/min on large minicomputers.

The compiler family is written in PL/I Subset G and performs as "front-end compilers"; that is, they include everything except the code generator.

This may be provided by the purchaser, who is normally more familiar with the machine code of the particular processor, or by LPI.

"The availability of a common code generator significantly reduces the investment needed to implement such an extensive language family on the target machine" Schwartzman said.

Life Cycle Timing

"It also allows the introduction of a multilanguage family early enough in the life cycle of the target machine."

The LPI family consists of Ansi-74 low- to intermediate-level Cobol, Ansi-74 high- to intermediate-level Cobol, Draft Ansi Pascal, Ansi-78 Fortran, Ansi Full PL/I, Ansi Subset-G PL/I and IBM System/3-compatible RPG-II.

Language Processors, Inc. is located at 254 Trapelo Road, Belmont, Mass. 02178.

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AEA Launches Study on Engineer Shortages

By Robert Batt
CW West Coast Bureau

PALO ALTO, Calif. — A campaign to help ease the critical shortage of electronics and computer science engineers in U.S. industry has been launched by the American Electronics Association (AEA) here.

Under the chairmanship of Dr. William Perry, former defense undersecretary in the Carter administration and now a general partner in the San Francisco investment banking firm of Hambrecht and Quist, the AEA has set up a Blue Ribbon Committee in Engineering Education to tackle the problem.

Perry, a former chairman of the AEA, said: "During my time in the Pentagon, I was continually impressed with the critical role the electronics industries play in our national security, giving us an 'equalizer' in defense systems and by contributing to a healthy national economy.

"Now, having returned to the private sector, I see evidence that the continuing vitality of that industry is threatened — not by a shortage of new ideas or new products — but by a growing shortage of engineering manpower," he continued.

The aim of the new committee is to come up with a plan of action to be presented to the AEA board for approval in September, with a view to implementing any proposals immediately. The focus of the committee reportedly will be on finding ways to attract more qualified teaching personnel to take up positions in universities.

Pat Hill Hubbard, AEA staff coordinator, told *Computerworld*: "Preliminary evidence we have taken indicates that there are considerable manpower shortages, particularly among electronics and computer engineers, and this is our area of highest concern.

"The primary problem is that there are not enough qualified teachers in our universities and, as a result, would-be students are being driven away from engineering schools and colleges in droves. The committee is focusing its attention on helping at the faculty level," she said.

Too Few Ph.Ds

The problem is well-documented. Last year, there were more than 2,000 vacancies for computer/teaching staff in higher education institutions across the country.

"The scale of salaries now available in industry is attracting people at the bachelor degree level and there is no real incentive to go on to the doctorate level," Hubbard said.

The new committee is to come up with recommendations to remedy the problem, with industry extending a helping hand to the universities.

Many members of the AEA fear that overseas computer manufacturers, particularly the Japanese, will pose a considerable threat by dealing with this problem more promptly. In 1977 alone, Japan, with half the population of the U.S., produced 359 more electronic engineering students than did the U.S.

Dr. Lester Hogan, director of Fairchild Camera and Instrument Corp. and a member of the new committee, voiced the general feeling among AEA members when he said: "As I look at the next 10 years, I worry about international competition.

"If we lose, it will be because we do not have the quantity of trained people for leadership in our industry. This is the single most important issue that our industry faces, bar none. Other issues will slow us down and make it tough, but we can still win. But the lack of qualified technical people means we cannot win."

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Fabri-Tek, Inc. announced a reduction in its bank debt, debenture and note obligations from $11,031,000 as of April 3, 1981 to $5,200,000. The company has also entererd into a new $7 million revolving loan agreement with First National Bank of St. Paul.

$ $ $

Computer Terminal Systems, Inc., a Plainview, N.Y.-based manufacturer of label, form and ticket printers, and **Allied Capital Corp.** of Washington, D.C., have announced the signing of a convertible, floating rate debenture agreement in the amount of $300,000.00

$ $ $

Automatic Data Processing, Inc. has filed a registration statement with the Securities and Exchange Commission covering a proposed sale of two million postsplit shares of its common stock. The postsplit shares result from a 2-for-1 stock split declared by the directors and payable on May 21.

$ $ $

Personal Software, Inc. has announced a private placement of $2.1 million of its stock with six venture capital groups. The new investor groups include Venrock Associates, Lamoreaux, Glynn and Associates, Fayez Sarofim, Franklin P. Johnson, Boole & Babbage and David Karetsky.

$ $ $

Systems Engineering and Manufacturing Corp. has declared a three-for-two split of its common stock.

$ $ $

Computer and Communications Technology Corp. made a public offering of 700,000 shares of its common stock at a price of $44.00 per share.

$ $ $

Tandem Computers, Inc. has approved a three-for-one stock split of the company's common stock, subject to required stockholder approval. Upon effect of the stock split, each share of the company's common stock will be converted into three shares of common stock and the company's authorized common stock will be increased from 20 million to 60 million shares.

$ $ $

Storage Technology Corp. has filed a registration statement with the Securities and Exchange Commission relating to a proposed public offering of $100 million principal amount of convertible subordinated debentures due 2001. Net proceeds from the sale of the debentures will be used for partial repayment of domestic bank debt of the company and its wholly owned nonconsolidated finance subsidiary.

$ $ $

A.T. Zirkle, former executive vice-president of Key Tronic Corp., has founded a venture capital fund for investing on a nationwide basis in the area of computer technology start-up companies. In addition, **Venture Sum** will provide management consulting services on a regional basis only during the first year.

$ $ $

Wang Laboratories (N.A.) N.V., a wholly owned Netherlands Antilles subsidiary of Wang Laboratories, Inc., has offered outside the U.S. $40,000,000 of 9-1/4% convertible subordinated guaranteed debentures due 1996 through a European syndicate headed by Merrill Lynch International & Co. The proceeds will be loaned to Wang Laboratories, Inc. to finance expansion of inventory and receivables, additions to demonstration, service and rental equipment, and additions to plant facilities.

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Japan Could Take Lead by '90, Industry Told

By Bohdan O. Szuprowicz
Special to CW

NEW YORK — It is almost inevitable that by 1990 the Japanese will achieve in computers what they have already done in automobiles — unless American hardware manufacturers remove their "long-term blinders" and the U.S. government assists the DP industry with investment credits and tax incentives.

This was the general warning voiced by Prof. Michael Dertouzos, director of MIT's Computer Sciences Laboratory and a White House technology planning adviser, at a special session on "The New Relationship Between American and Japanese Electronics Industries" during a recent conference here.

The special session was jointly chaired by Nobel physics laureate Dr. Leo Esaki, an IBM Fellow, and Dr. Bruce Hannay, vice-president of research at Bell Telephone Laboratories.

The U.S.-Japanese panel included Dr. Hiroshi Inose, director of the National Computer Center at the University of Tokyo and science adviser to the Organization for Economic Cooperation and Development in Paris; Dr. M. Uenohara, research director of Nippon Electric Laboratories; and William C. Hittinger, executive vice-president for research and engineering at RCA.

MIT's Dertouzos discussed the 10-year plan developed by Japan Information Processing Development Corp. (Jipdec) that outlines the steps to be taken towards assuring Japan a leading global position in computer systems technology by 1990. He pointed out that many of the research and development programs of the Jipdec plan are very similar to those previously proposed by various American computer scientists at MIT and other research centers.

The Japanese readily admit that they closely monitor American computer research proposals and concede extensive technological innovation leadership to American computer scientists.

In Japan, however, advanced concepts that are likely to enhance Japan's long-term plan to become No. 1 in computers are promptly supported by both industry and government; American manufacturers concentrate more on immediately profitable developments, and U.S. government has a history of being friendlier to unsuccessful industries.

Dertouzos cited the development of the Illiac multiprocessing system, at the University of Illinois since the 1960s, as an example of an advanced research project that only left a bad taste in the American computer science community. Yet he considered the concepts of "sensory computing" based on such multiprocessor computer systems that may use over 1,000 processors as the wave of the future in industrialized societies.

Japanese Contrast

By contrast, such multiprocessing concepts have been quickly embraced by the Japanese. Tokyo University's Inose explained that the construction of an extensive social informational infrastructure is considered to be a necessity for the future survival of Japan, which is completely dependent on imports of most raw materials for its industries and whose labor force is regarded as its greatest asset.

Computers and telecommunications provide the means to achieve these informationalization objectives, while Japanese industries are a huge and immediate market for such hardware and its associated software.

As a result, research, development and manufacturing in those industries have become national priorities. Aggressive export trade growth is a natural consequence of these activities.

Inose viewed future U.S.-Japanese relations in electronics following collaborative, complementary and competitive paths simultaneously. He said language translation systems offer particular opportunities for joint U.S.-Japanese research and development programs that could lead to improved means of communications on a global basis.

Complementarity between the two countries, he said, is most likely to flourish in defense technology, where Japan expects the U.S. to develop and supply the most advanced computerized electronic countermeasures for surveillance and airborne antisubmarine warning systems.

While all the panelists agreed that free trade between Japan and the U.S. should not be hampered, it was also recognized that since Japan is now seeking a new role in global electronics and the U.S. remains the fountainhead of new ideas, more protection of undesirable technology leakages would be in order.

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SS-6 **Controlling Data Base Implementation Costs**	July 13-15	June 15-17	May 13-15	June 29-July 1				
SS-7 **EDP Personnel Management:** Recruiting and Maintaining an Effective Staff	June 24-26	June 8-10	July 13-15	May 18-20				
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EM-4 **EDP Project Management:** A Practical Approach	May 27-29	May 18-20	July 8-10	June 29-July 1			June 8-10	
EM-5 **Advanced EDP Management:** Methods and Techniques in the 80's	June 29-July 1	July 8-10	June 3-5	May 18-20				
OA-1 **Introduction to Word Processing:** Concepts, Systems and Applications	June 29-July 1	May 11-13	June 15-17	May 18-20		(A) July 13-15		
OA-2 **Word Processing:** Effective Operations Management	June 15-17	June 22-24	June 29-July 1	May 27-29		(D) May 18-20		
OA-3 **Integration of Word Processing and EDP Systems**	June 3-5	June 29-July 1	June 8-10	July 13-15	May 27-29			
G-1 **Data Processing:** An Introduction to Concepts and Systems	May 18-20	June 15-17	June 22-24	July 8-10		(D) May 27-29		June 29-July 1
G-2 **Minicomputer Systems:** Guidelines for Successful Selection, Acquisition and Operation	May 18-20	June 8-10	May 27-29	June 29-July 1	July 15-17			
G-3 ***NEW — Using PASCAL/ADA for Increased Programming Efficiency***	May 13-15	June 17-19	June 1-3	July 8-10			July 15-17	
G-4 ***NEW — Using Computer Graphics:*** Techniques, Systems and Applications	May 18-20	June 15-17	June 22-24	July 13-15				
G-5 ***NEW — Effective Oral Presentation Techniques for DP Professionals***	May 11-13	June 1-3	June 15-17	June 29-July 1				

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Contracts

Microcomputer Systems Corp. has received a $1.1 million sales order for advanced disk drive controllers from R2E, a CII-Honeywell Bull subsidiary.

Century Computing, Inc., Silver Spring, Md., has been awarded a $390,000 contract to develop a Transportable Applications Executive for the National Aeronautics and Space Administration (Nasa). The first system is to be installed under VMS on a VAX-11/780 at Nasa's Goddard Space Flight Center.

Canada Systems Group has signed a three-year contract valued at $80,000 annually with Computeristics, Inc., Hamden, Conn. Canada Systems Group computing power will be used for the development and modification of Computeristic's custom software packages.

Tandon Magnetics Corp. has been awarded an $8.8 million contract from Televideo Systems, Inc. for Tandon's 5.25-in. Winchester and high-density floppy disk drives.

Leasametric, Inc. has signed a $1.5 million contract for graphics display terminals manufactured by Tektronix, Inc.

The Sorbus Service Division of Management Assistance, Inc. has been awarded a contract by FTD — the florist cooperative — to service 7,000 Mercury Console computer terminals nationwide. The terminals, built especially for FTD, are used to send order information from one florist to another.

Sanders Associates, Inc. has received a $1.3 million U.S. Air Force exploratory development contract for an advanced avionics computer that will utilize the Air Force's standard programming language, Jovial.

Tymshare, Inc. has signed a contract with Matra, the major French manufacturer of Telecommunications equipment, for purchase of 100,000 personal computer terminals. Under terms of the multiyear contract, Matra will provide Tymshare with three models of desktop CRT terminals, including a personal communications terminal.

Supershorts

Patricia R. Krever, executive vice-president of Turnkey Sales & Leasing, Inc., was recently honored by the YWCA as one of the Class of 1980 Academy of Women Achievers.

Braegen Corp. and Management Assistance, Inc. (MAI) have terminated their asset purchase agreement because certain conditions in the agreement, required by MAI, were not met.

Integrated Software Systems Corp. has restructured its organization with a move from contracted agents to six direct sales offices and new emphasis on marketing support, in response to a reported four-fold increase in sales over the past two years.

Comshare, Inc. will sell its individual income tax processing services operations and has adjusted its investment to estimated net realizable value, resulting in a book loss in excess of $2 million.

University Computing Co. has recently acquired the Crisp software product line from Ampex Corp. of Bohemia, N.Y.

Apple Canada, Inc. and Norpak Ltd. have jointly announced that they have entered into an agreement whereby Norpak will design and manufacture a Telidon interface card for Apple II and Apple III personal computers.

Shugart Associates has begun manufacturing operations at the first of four 80,000 sq ft buildings it plans to occupy in Roseville, Calif.

GTE Telenet Communications Corp. has been selected to design and build a public data communications system in Chile.

Mergers & Acquisitions

UTG, a New York City-based privately owned holding company, has sold **Alanthus Corp.**, a major computing finance organization, to a group of investors headed by Jerry Minsky, Alanthus' president.

Logetronics, Inc. has reached an agreement in principle to acquire all the shares of **Dunn Systems, Inc.** of San Francisco. The agreement involves 350,000 shares of Logetronics common stock.

Cistinetwork Corp. has acquired **Uni-Coll Corp.** for an undisclosed figure. Uni-Coll is located in Philadelphia's University Science Center and provides on-line computer services to academic and commercial users from a large IBM MP-168 computer system.

Informatics, Inc. has acquired the assets of **Professional Software Systems, Inc.** (PSS). PSS, a Phoenix-based supplier of proprietary software and minicomputer turnkey systems for law office management services, will become part of Informatics Legal Information Services Operations.

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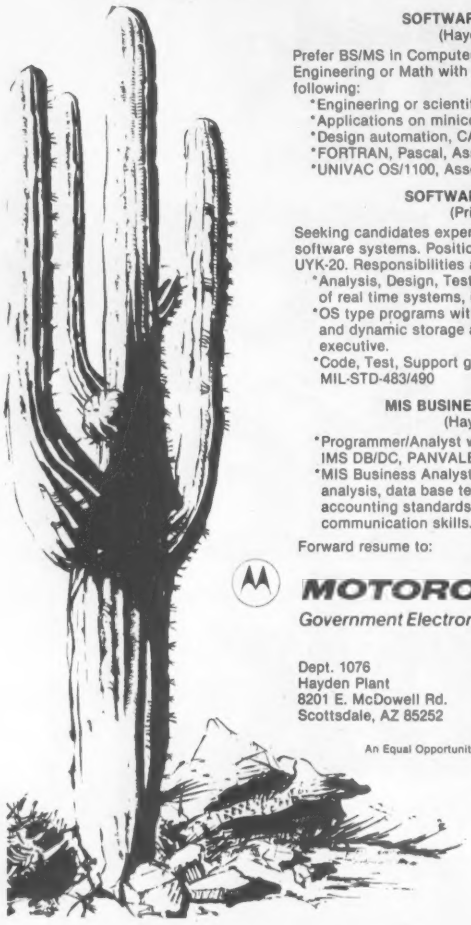

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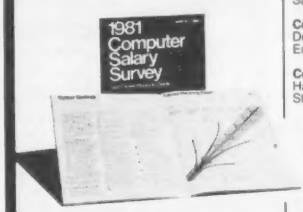

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P/A — DEC PDP/11 Fortran	$21K
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To teach college level courses in Computer Technology in Associate Degree program. Must have MS, Mathematics or Computer Science and two years experience in teaching college level Math or Computer Science. 40 hours per week. Annual salary $16,000. Apply to:

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To compile and analyze data to facilitate development of business systems; confer with Corporate personnel; prepare reports of findings and recommendations and implement new method and systems. Duties may include generation and maintenance of our system software and on-line data base management system. Design and write programs using COBOL programming language. Bachelor of Science degree with major field of study in Business Data Processing required. In lieu of college degree three years experience in job offered or as a Systems Analyst, or as a programmer with experience in COBOL. 37 1/2 hours per week; $25,000 per year.

Contact: Ann Adams, Rand McNally & Co., 865 North Central Park Ave., Skokie, Ill. 60076

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Applications are invited for a full-time tenure-track undergraduate teaching position in Computer Science at Lock Haven State College, Pa., beginning August 1981. Rank and salary dependent upon experience and qualifications, up to $30,300. Business, industrial, or teaching experience required; master's degree in computer science required; Ph.D. in computer science preferred. Candidates without the required credentials will be considered for a temporary non-tenured appointment. Applications will be accepted until position is filled. Send vita, including unofficial transcripts, and letters of recommendation to **Prof. Ralph E. Kuhn, Chairman, Computer Science Search Committee, Lock Haven State College, Lock Haven, PA. 17745.** An affirmative action/equal opportunity employer.

Honeywell
PROCESS MANAGEMENT SYSTEMS DIVISION

Real-Time Systems & Applications Software

Energy Management & Process Control

Honeywell Process Management Systems Division is the world-wide leader in the design, development and implementation of computerized energy management and control systems. The Division operates through two primary business entities--the Electric Utilities Business Group and the Industrial (Process) Business Group. There are currently several openings for top computer professionals, who will work at the Group Software Development and Support or Projects Software levels. All these positions, outlined in brief below, require solid experience in a real-time process control environment.

Systems Programmers

Project Software

Customizing Honeywell Systems to needs of individual clients with emphasis on man/machine interface. Structured design environment. BSEE in Computer Science or equivalent, and at least 3 years PAL/Fortran programming and design background necessary.

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Provides major technical support at the pre and post sales stages, with emphasis on monitoring power plant thermal processes and performance. BSEE or Computer Science preferred, with solid background in real-time process control programming and design assignments on turbines, boilers and feed water heaters.

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This is a new position, created to ensure Software System and applications integrity and performance to specifications; includes audit and recommendations for performance enhancements. BSEE or Computer Science, and strong experience of system software development and programming techniques in a process industry required.

Honeywell PMSD is headquartered in Phoenix, a unique metropolitan area combining all the charm of the desert southwest with the exciting lifestyle of the nation's 9th largest city. One look at Honeywell's facility and development plans will convince you of our commitment - we'd like to hear more about yours. For a possible local interview, call 263-8910 (collect) or write to: R.H. Bates, A-55, CW525, **Honeywell Process Management Systems Division, 16404 N. Black Canyon Highway, Phoenix, Arizona 85023.**

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PROGRAMMER ANALYSTS

COLORADO OPPORTUNITY

Teledyne Water Pik, a world leading consumer product company, has immediate openings available for individuals with COBOL/RPG programming experience. We are presently in a conversion mode and operate remote on an IBM 3031 CICS DOS/VSE.

We offer competitive salary, comprehensive benefits with these career opportunities in the choice city of Colorado. For immediate and confidential attention, send your professional qualifications to:

D.A. Pulliam

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Consulting Engineering firm specializing in water resources and waste management is expanding its capability in computer based data acquisition and control systems. Our current need is for a:

PROJECT PROGRAMMER PROCESS CONTROL with 4 year degree in computer science or related discipline and 4 years experience writing and realtime application programs. Will be required to develop and implement customized realtime data acquisition and control software in Fortran and Assembler languages on a variety of mini and microcomputer systems.

Qualified persons should send resume to:

O'Brien & Gere Engineers, Inc.
P.O. Box 4873
Syracuse, New York 13221

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We need Field Engineers with 3 or more years experience to service the CPU's, disc drives, printers and telecommunications equipment we sell and install for our customers. Travel in a 9 state area will require over night out of Sacramento for 3 to 5 days regularly and up to 10 days or more at a time.

Computer Engineers
Sacramento

This in-house position requires a minimum of 3 years experience repairing CPU's, line printers, disc drives and telecommunications equipment. Additional experience in repairing micrographic equipment is a plus.

Purchasing Agent

In this newly created position we are seeking an individual with 5-10 years experience purchasing COMPUTER SYSTEMS. The successful candidate must be familiar with manufactures and their product lines of large frame CPU's, mini's, disc drives, printers, CRT's and telecommunications equipment and have superior skills in contract negotiation. A college degree is required.

CABLEDATA is the industry leader in providing Cable TV systems with hardware and software management services. With over 50% of the market share and no major competitors, we expect to continue the annual growth we have experienced of 35% - 65%. We offer competitive salaries, excellent company paid benefits program, stock ownership at no cost to you, and outstanding opportunities for career growth. If you are interested, call (916) 488-1642 collect, or send your resume and salary history to CableData, 3200 Arden Way, Sacramento, California. 95825.

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ANALYST/PROGRAMMERS

Requires 2+ years experience in oil and gas applications, DEC VAX or PDP environment preferred. Will be responsible for developing one of the following on-line applications.

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To enhance our leadership role in the industry, we are seeking an exceptional Design Engineer to aid in the refinement of existing hardware and to develop more advanced systems. The individual we seek must have an EE degree, digital design background, and 8085 or related hardware and software design experience. Responsibilities center around taking design from prototype stages through systems integration. This position reports directly to the V.P. of Engineering, and will be based at our Corporate Headquarters in Hunt Valley, Maryland.

The selected candidate will enjoy a generous salary commensurate with experience, a comprehensive benefits package, and opportunities for rapid Professional growth. Paid relocation is also provided.

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JoAnn Schmidt, Personnel Manager
DISPLAY DATA CORPORATION
Executive Plaza IV
Hunt Valley, Maryland 21031
OR CALL (800) 638-1100
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Cullinane Database Systems, Inc., the most respected publicly-held company in the computer software industry, is a leader in introducing state-of-the-art software products. Our continued rapid growth, as reflected by a greater than 60% increase in revenue and profits this past year, provided the challenge and stimulating environment required by talented career professionals.

Our rapidly expanding customer base has created additional technical support positions in the New York and New Jersey areas. The Technical Field Consultant will provide phone and on-site support to current and prospective customers and will conduct regional education classes for our IDMS customers. The individuals who qualify will have extensive background in the medium/large IBM mainframe environment (DOS/VS or VSE preferred). A minimum of 3 years' experience in systems programming a plus. Data communications or database administration essential.

If you have the credentials to become a member of our Technical Support Team, you will be working with the most advanced, highly skilled experts in software. Your opportunity for professional growth and reward is unlimited. A career at Cullinane is a success story.

Qualified applicants should send resume to:

Mr. Terence McHenry
Customer Support Manager
Cullinane Database Systems, Inc.
33 Wood Avenue, South
Iselin, New Jersey 08830

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Database Systems

COBOL PROG/ ANALYST

Central Mass. based fin'l. svcs. co. is expanding their EDP dept. Co. seeks bright, articulate COBOL P/A to work on new dev. projs. In state-of-the-art IBM environ. Hvy. user interface with promotion to proj. ldr. likely within first yr. Salary $24,000 (fee paid). Contact Gerry Battista.

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(617) 423-1200
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Teach DP concepts, languages of BASIC, COBOL, RPG II, & PASCAL & Systems Analysis at two year college. Eligible for Calif. community college credential. Teaching or business/industry exper. MA preferred. Two full time, many part time positions. Beg. 8/28/81. Deadline to apply 6/12/81.

Contact: Dean of Business Division, Southwestern College, 900 Otay Lakes Rd., Chula Vista, CA 92010. 714-421-6700, Ext. 278.

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Systems Programmers IBM 3033-U/MVS

Our client company, a service center with three IBM 370/158's and one IBM 3033-U, is looking for Systems Programmers at all levels of expertise.

This is a challenging opportunity as they currently service the four western states with 4,000 on-line terminals and plan on doubling in size in the next two years.

If you have experience in a BAL shop on IBM 3033 MVS and/or 370/158 OS/VSI, we want to talk to you.

Contact: Bob Sherwood-in confidence.
Pickard, Sherwood & Assoc.
Personnel Service
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Fresno, CA 93710
209-222-5666

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Honeywell
PROCESS MANAGEMENT SYSTEMS DIVISION

Business Planning Analyst

High Technology Product Pricing Systems

The Product Operations planning group provides management, guidance and advice to Honeywell Process Management Systems Division's two primary business operation units--the Electric Utilities Business Group and the Industrial Business Group. A long term strategic thrust has been initiated to further enhance and streamline the distribution of product pricing information world-wide, with emphasis on simplifying quotation, processing and competitive price analysis. This position will be responsible for automating and supporting existing packages, and developing, implementing and supporting new product structuring. You will also participate in the analysis and review of existing product reference systems.

BSEE or Computer Science discipline, and several years experience with quoting and configuring complex computer-based systems, possibly as a Sales Engineer, or as a Business Planning Analyst in a directly related applications area. Experience should include Fortran programming in a large, high technology company.

Honeywell PMSD is headquartered in Phoenix, a unique metropolitan area combining all the charm of the desert southwest with the exciting lifestyle of the nation's 9th largest city. For a possible local interview, call 263-8910 (collect) or write to: R.H. Bates, A-55, CW525, Honeywell Process Management Systems Division,

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16404 N. Black Canyon Hwy.
Phoenix, Arizona 85023
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Computer Sciences Corporation

Assignments in Switzerland

CSC, the world's largest independent software firm and a leader in the information sciences, offers a variety of positions open for minimum 2-year assignments in Bern, Switzerland. Fluency in German is required, and previous telecommunications experience would be very useful. The opportunities:

Quality Assurance Manager

Requires 5-10 years experience in the development and implementation of computerized systems, with at least 4 years in the development and enforcement of approved design, programming, test and technical documentation. At least 2 years working in a managerial capacity is necessary.

Planning Manager

Requires 6-8 years experience in project management/control of software development activities, plus hardware/system engineering in large telecommunications systems. Will develop and implement policies, procedures and methods required for project support.

Planner

Must have minimum 3 years experience in project planning for software development. Will prepare and maintain schedules, resource forecasts and prepare project progress/status reports.

Configuration Management Engineer

Requires 3-5 years experience in software development, including familiarity with QA, acceptance testing, integration and installation processes. Must be familiar with HLL and Assembler languages, plus automation of CM data base management. Will establish and keep current CM procedures to project software.

Lead Systems Engineer

Requires 6-8 years experience in the design and development of computerized systems, with at least 4 years in systems engineering in design, analysis and verification on large scale automated systems. Minimum 2 years managerial experience is desired.

These assignments offer substantial rewards, including paid relocation. For prompt professional consideration, please send resume with salary history to Craig Bucy, Corporate Manager, International, or phone **(213) 615-0311, ext. 2312 or TOLL FREE 1-800-421-2086, ext. 2312.**

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The State College Board, State of Mississippi, is seeking several senior programmers and analysts to assist in developing of statewide Management Information Systems for the eight public universities. Qualified applicants will hold a degree in Computer Science or a related field and possess at least two years of experience. Very strong preference will be given to those with heavy exposure to COBOL in a financial applications environment.

Senior Analysts with financial applications background and some supervisory experience are needed to lead major segments of the project.

Salaries will range from $20K to $35K, depending upon background and ability.

Please send your resume or call:

Malcolm Lightsey, MIS Project Director
P.O. Box 2338
Jackson, MS 39205
601/982-6147

EOE, M/F

POSITION AVAILABLE

CHRISTMAS? — If you are waiting for that particular holiday to put your FORTRAN or RPG II skills to work, DON'T! Call now and be the programmer you always wanted to be! $ Negotiable.

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American Health Foundation
320 East 43rd St., New York, N.Y. 10017

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SENIOR SYSTEMS ANALYST

A move to Northwest Alaskan Pipeline Company might be the most important move of your career.

We realize many companies restrict their employee's ability to be innovative and fail to challenge their potential. At Northwest Alaskan, we encourage continuing challenge and career growth. We currently have an opening for an individual to be responsible for user system support in Irvine, for financial and construction control systems. You will also be responsible for user requirements, definition of system design and implementation of construction control systems. You will oversee and direct contract personnel in the accomplishment of foregoing projects.

The ideal candidate will possess a Bachelor's degree or equivalent in data processing or related business discipline, and 6-10 years experience in financial/-construction control systems operating in an IBM processing environment. A knowledge of COBOL, IMS, DB/DC, TSO and CICS along with familiarity or experience with mini computers and relational data bases is desired.

If you are interested in challenging your abilities, make your move to our expanding energy company. We offer an excellent salary and benefit package. For immediate consideration, please send your resume INCLUDING SALARY HISTORY to: **Herman G. Best, Northwest Alaskan Pipeline Company, C/O Fluor Engineers & Constructors, 3333 Michaelson Drive, Irvine, CA 92730.** We are an equal opportunity employer m/f.

SOFTWARE SPECIALISTS
SANTA FE, NEW MEXICO

The State of New Mexico has openings in capacity planning, performance monitoring, and online systems. The current operating environment includes a 370/158 running MVS-SE and JES2 with CICS, ATMS/STAIRS, ACF/ATAM, ACF/NCP, and IDMS, and a 3031 running MVS-SE and JES2 under VM/SP with CMS.

Applicants must have a high school education or equivalent, plus any combination of training, education, and experience in operations, programming, systems analysis or closely related fields, totaling eight years; two years must be experience in applications or systems programming or analysis and one year must be experience in software. Applicants for capacity planning and performance monitoring should have extensive knowledge of computer capabilities and operations, performance considerations, and system maintenance; responsibilities include hardware/software evaluations and other miscellaneous software related tasks. Applicants for online systems support should have extensive knowledge of online teleprocessing system capabilities, operations, and performance; responsibilities include installation, maintenance, and enhancement of our current CICS online software.

SALARY: Up to $35,000. Depending Upon Qualifications.

Submit resume or contact Caesar Snee, Systems Software Bureau Chief, Automated Data Processing Division, 715 Alta Vista, Santa Fe, New Mexico 87503. (Phone: 505-827-3271 extension 285.)

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Operating Systems Development, I/O Driver interface, telecommunications and TI-990 or comparable (TI 9900, 8080, Motorola 6800 or 68000) experience essential. Assembler, PASCAL, FORTH, and/or COBOL knowledge required. Background in project management, structured programming development techniques and user interface a plus.

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Requires strong background in diagnostics and hardware/software architecture. Plans, directs, and coordinates implementation of all phases of technical systems design. BS/MSEE and relevant experience essential.

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Experience in market/product planning, engineering design, customer applications supprot or competitive analysis would be extremely valuable. Excellent oral and written communications skills required. Please send resume in confidence to:

QUANTUM SCIENCE CORPORATION
Joseph C. Briley
Vice President
1114 Ave. of the Americas,
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SENIOR PROGRAMMERS

The City of New York is currently implementing a major CICS system in the criminal justice area. The system utilizes ADABAS, and will run under OS/VS1 on an IBM 370/158.

Several senior level CICS progrmmers are required to support this effort. The successful candidates will have experience in the following:

- CICS/VS Systems Support and/or Applications Programming
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- VM/CMS
- VSAM
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These are challenging positions in which the incumbents will be part of a high-level team providing systems software support for a major City computer center. The City offers an excellent benefits package including 4 weeks annual vacation. Salary is mid-$20's to mid-$30's, commensurate with experience. Please send resume including salary history to:

Stuart Roth
PROMIS Project Manager
Office of the Mayor
Coordinator of Criminal Justice
250 Broadway, Room 1420
New York, New York 10007

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602-266-7000

Programmer/Analyst

Knowledge of COBOL and RPG languages. Experience in organizing, developing and maintaining on-line real time software and hardware systems. Will assist in supervision while assuring quality control, evaluating and monitoring work flow. Mini-computer experience helpful. Excellent benefit package and salary commensurate with experience. Send resume to:

Personnel Dept.
St. Luke's Medical Center
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Sioux City, Iowa 51104

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SYSTEMS ANALYST

Search Extended
Carnegie-Mellon University

Participation in design and implementation of integrated automated library system, supervise programmers. Design grant proposals.

Qualifications: Bachelor's degree, two years' programming experience on minicomputers, systems design, knowledge of computer hardware, strong communications skills. Preference will be given to applicants with knowledge of MUMPS, BASIC and interpretive languages. (Closing date is June 30.)

Send resume and three references to:
Administrative Manager
University Libraries
Carnegie-Mellon University
Pittsburgh, Pennsylvania 15213

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- **At least two years of programming experience with a good knowledge of OS, DOS or CMS, and/or BAL experience.**
- **Plus a certain "x factor"–brightness, academic distinction, ability to work with other professionals, and a desire to be a little different.**

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An equal opportunity employer, M/F.

Call (201) 568-9700.

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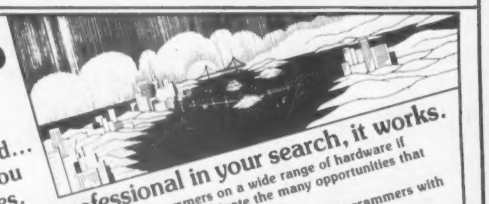

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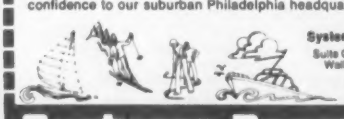

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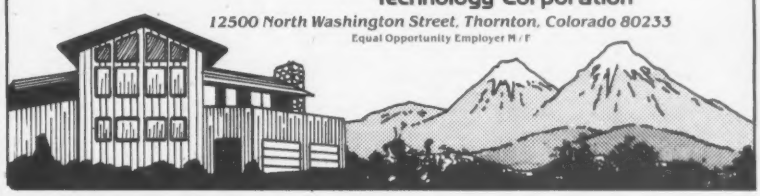

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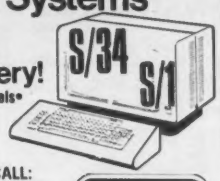

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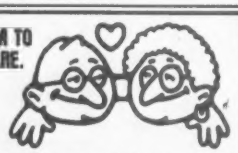

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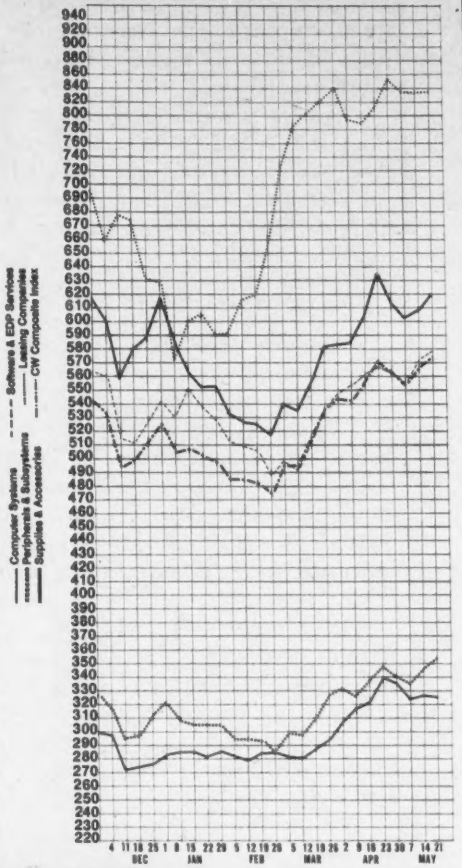

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 20, 1981

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1980-81 RANGE (1)	CLOSE MAY 20 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	40 1/4	+ 7/8	+2.2
N	BURROUGHS CORP	43- 88	43	- 1/2	-1.1
O	COMPUTER AUTOMATION	8- 27	13 1/4	+1	+7.0
N	CONTROL DATA CORP	35- 78	78 3/8	+8 3/8	+8.7
O	CRAY RESEARCH INC	10- 48	44 1/2	+3 7/8	+9.5
N	DATA GENERAL CORP	46- 87	81 3/8	-2 1/8	-3.3
N	DATAPOINT CORP	22- 85	82 3/4	+5 1/4	+8.1
N	DIGITAL EQUIPMENT	52-108	101 1/2	-1 3/8	-1.3
A	EECO INC	8- 19	18 7/8	0	0.0
N	ELECTRONIC ASSOC.	6- 12	7 1/4	0	0.0
N	FOUR-PHASE SYSTEMS	18- 49	39	- 3/4	-1.8
N	FOXBORO	31- 82	52 1/4	-1 3/4	-3.2
O	GENERAL AUTOMATION	7- 18	14 3/4	+ 1/8	+0.8
O	GRI COMPUTER CORP	1- 3	1 1/2	0	0.0
N	HARRIS CORP	25- 60	51 3/4	- 5/8	-1.1
N	HEWLETT-PACKARD CO	48-104	102	+2 5/8	+2.8
N	HONEYWELL INC	85-115	91 7/8	-2	-2.1
N	IBM	50- 78	58 3/8	- 3/8	-0.8
O	MAGNUSON COMP SYSTS	20- 46	31	+1	+3.3
N	MANAGEMENT ASSIST	9- 25	14	0	0.0
O	MINI-COMPUTER SYST	1- 8	2 1/4	- 1/8	-5.2
N	MODULAR COMPUTER SYS	9- 31	12 7/8	0	0.0
N	MOHAWK DATA SCI	10- 31	27 1/8	+3 1/4	+13.8
N	NCR	32- 82	65 1/8	+1 1/8	+1.7
N	PRIME COMPUTER INC	10- 45	45 3/8	+1 1/8	+2.5
N	PERKIN-ELMER	13- 35	30 1/8	-2 1/8	-6.5
N	SPERRY CORP	42- 65	49	- 1/4	-0.5
O	TANDEM COMPUTERS INC	13-104	103 1/2	+13 1/2	+15.0
N	TEXAS INSTRUMENTS	78-150	112	+2 1/2	+2.2
A	WANG LABS.	17- 80	37 7/8	+2 1/4	+8.3

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	13- 27	25 1/4	+ 1/4	+1.0
N	COMDISCO INC	6- 24	21 3/4	+ 1/2	+2.3
A	COMMERCE GROUP CORP	1- 2	1	0	0.0
A	COMPUTER INVSTRS GRP	1- 4	5/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	7 1/4	+ 1/4	+3.5
M	DATRONIC RENTAL	3- 5	4 1/8	- 1/8	-2.9
A	DCL INC	3- 8	3 1/4	+ 1/4	+8.3
N	DPF INC	5- 12	8	- 1/4	-2.7
O	ITEL	1- 15	1	0	0.0
O	LEASPAC CORP	1- 2	3/8	0	0.0
A	PIONEER TEX CORP	2- 4	2 7/8	- 1/4	-8.0
N	RELIANCE GROUP INC	24- 84	78 1/8	- 5/8	-0.7
N	U.S. LEASING	12- 30	25 1/4	+1	+4.1

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O	ADVANCED COMP TECH	1- 8	5 3/4	0	0.0
O	ADVANCED SYSTEMS INC	12- 15	13 1/2	-1 1/4	-8.4
O	ANACOMP INC	7- 24	20 1/4	- 1/4	-1.2
O	ANALYSTS INTL CORP	3- 14	7 3/4	- 1/4	-3.1
A	APPLIED DATA RES.	8- 24	20 1/2	+1 1/8	+5.8
N	AUTOMATIC DATA PROC	31- 63	58 1/2	+ 1/2	+0.8
O	CGA COMPUTER ASSOC	8- 17	10 1/4	+ 1/4	+2.5
O	COMPUTER HORIZONS	1- 5	2 7/8	+ 5/8	+27.7
O	COMPUTER NETWORK	4- 9	4 3/4	0	0.0
N	COMPUTER SCIENCES	11- 30	23 1/8	+ 7/8	+3.9
O	COMPUTER TASK GROUP	1- 23	18 3/4	- 1/4	-1.4
O	COMPUTER USAGE	2- 10	4 1/4	0	0.0
O	COMSHARE	11- 21	13 1/2	- 1/2	-3.5
O	CULLINANE DATABASE	18- 65	83	+4	+6.7
O	DATA DIMENSIONS INC	1- 8	1 5/8	0	0.0
O	DATATAB	1- 4	2	+ 1/8	+8.8
O	DSI CORP	4- 9	5 1/8	- 1/8	-2.3
O	DYATRON CORP	4- 11	9	+ 1/4	+2.8
N	ELECTRONIC DATA SYST	18- 54	52	+4 1/2	+8.0
O	INFORMATICS INC	8- 33	28 1/4	+1	+3.6
O	INSYTE CORP	1- 3	2 1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 4	1 1/2	0	0.0
O	KEANE ASSOCIATES	3- 9	6	0	0.0
O	KEYDATA CORP	1- 3	3/4	0	0.0
A	LOGICON	12- 34	31	- 7/8	-2.7
O	MNGT SCI AMER INC	17- 23	22 3/8	+2 1/8	+10.4
O	MATHEMATICA INC	5- 18	14	+ 1/2	+3.7
O	MATHEMATICAL APP GRP	7- 33	22 1/2	-1	-4.2
O	NATIONAL DATA CORP	5- 25	22 1/8	-1	-4.3
N	PLANNING RESEARCH	5- 13	7 3/8	+ 1/4	+3.5
O	PROGRAMMING & SYS	1- 1	1	0	0.0
O	RAPIDATA INC	4- 11	8 3/8	+ 1/2	+6.3
O	REYNOLDS & REYNOLD	18- 34	20 3/4	0	0.0
O	STSC INC	8- 28	20 3/4	+ 1/2	+2.4
O	SCIENTIFIC COMPUTERS	3- 17	8 1/2	-1	-9.5
N	TYMSHARE INC	17- 58	48 3/8	-2 1/4	-4.6
A	URS CORP	5- 17	15 1/4	+ 1/4	+1.6
N	WYLY CORP	4- 20	12	- 1/8	-1.0

PERIPHERALS & SUBSYSTEMS

N	AM INTERNATIONAL	11- 24	13 3/8	- 1/8	-0.9
A	ANDERSON JACOBSON	8- 25	18 1/4	+1 1/4	+7.3
O	AUTO-TROL TECHNOLOGY	18- 62	23 1/2	-1 1/2	-6.0
O	BEEHIVE INT'L	2- 18	15 1/2	0	0.0
A	BOLT,BERANEK & NEW	8- 25	21 3/4	+ 1/2	+2.3
N	BUNKER RAMO	17- 54	52 1/2	+ 1/2	+0.9
O	CAMBEX CORP	1- 8	7	- 1/8	-1.7
N	CENTRONICS DATA COMP	11- 55	12 1/2	+ 1/2	+4.1
A	CETEC CORP	3- 8	6 7/8	- 1/8	-1.7
O	COMPUTER DEVICES INC	5- 10	7 3/4	- 1/2	-6.0
O	COGNITRONICS	1- 11	8 3/4	- 7/8	-8.2
O	COMPUTER COMMUN.	2- 10	2 1/2	+ 1/2	+25.0
O	COMPUTER CONSOLES	4- 34	32	+1 1/2	+4.8
O	COMPUTER TRANSCEIVER	1- 7	6 5/8	- 3/8	-5.3
N	COMPUTERVISION CORP	24- 95	91	+4 1/2	+5.2
N	CONRAC CORP	13- 25	21 1/4	0	0.0
A	DATA ACCESS SYSTEMS	8- 23	12 3/8	- 1/8	-1.0
A	DATAPRODUCTS CORP	11- 44	32 1/8	-1 5/8	-4.8
O	DATUM INC	2- 5	3 1/8	0	0.0
O	DECISION DATA COMPUT	2- 6	4 3/8	0	0.0
O	DELTA DATA SYSTEMS	1- 3	3 1/8	- 1/8	-3.8
O	DATARAM CORP	5- 37	9 7/8	+ 5/8	+6.7
N	ELECTRONIC M & M	3- 8	8	- 1/8	-2.4
O	EVANS & SUTHERLAND	21-118	115 1/2	+10 1/2	+10.0
O	FABRI-TEK	1- 5	4 1/8	+ 1/4	+6.4
O	GENERAL COMPUTER SYS	1- 12	8 3/4	0	0.0
O	GEN'L DATA COMM IND	8- 22	14 1/2	+ 1/4	+1.7
O	GENERAL TERMINAL CP	1- 4	1 1/4	0	0.0
N	HAZELTINE CORP	12- 33	22 1/2	+ 1/2	+2.2
O	INFORMATION INTL INC	8- 13	10 3/4	- 1/4	-2.2
O	INTEL CORP	23- 50	37 1/4	+2	+5.8
A	LUNDY ELECTRONICS	4- 17	11 7/8	+1 7/8	+18.7
O	MSI DATA CORP	5- 21	20 1/8	+1 1/8	+5.9
N	MEMOREX	10- 34	13	+ 3/8	+2.9
O	NETWORK SYSTEMS CORP	14- 29	23 3/8	- 3/8	-1.5
O	OMEX	2- 12	12	0	0.0
A	PARADYNE CORP	8- 50	47 3/4	+ 1/2	+1.0
A	PENRIL CORP	8- 17	13 7/8	+ 1/8	+0.9
O	RAMTEK CORP	10- 23	15	0	0.0
O	RECOGNITION EQUIP	5- 21	13 1/2	-1 3/8	-9.2
O	SCAN DATA	1- 3	2 1/8	-	-2.8
N	STORAGE TECHNOLOGY	12- 32	32 1/4	+1 1/8	+3.8
O	SYKES DATATRONICS	14- 84	83 3/4	+10 1/4	+18.1
O	T BAR INC	14- 24	18 7/8	+2 1/8	+11.9
A	TEC INC	3- 8	5	+ 1/4	+5.2
N	TEKTRONIX INC	42- 70	57 3/4	- 1/8	-0.2
N	TELEX	3- 9	8 1/4	+1 1/4	+15.8
O	TESDATA SYSTEMS CP	8- 28	8 3/4	+ 1/2	+5.4
A	TIMEPLEX INC	9- 22	13 7/8	+ 1/4	+1.8
O	WILTEK INC	1- 3	2 7/8	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS PRODS	8- 18	15 5/8	- 3/8	-2.3
O	BALTIMORE BUS FORMS	1- 2	1 1/4	0	0.0
N	BARRY WRIGHT	8- 22	18 1/2	+ 3/8	+1.8
O	CYBERNATICS INC	1- 2	1 1/8	- 1/8	-10.0
A	DUPLEX PRODUCTS INC	11- 18	14 5/8	+ 3/8	+2.8
N	ENNIS BUS. FORMS	13- 21	18 3/8	- 1/8	-0.6
N	3M COMPANY	46- 85	56 1/8	-2 1/8	-3.6
O	MOORE CORP LTD	27- 38	35 1/4	- 3/8	-1.0
N	NASHUA CORP	20- 35	22 1/8	- 1/4	-1.1
O	STANDARD REGISTER	22- 35	33 1/2	+ 1/4	+0.7
A	TAB PRODUCTS CO	8- 30	23 3/8	+2 5/8	+12.8
N	WALLACE BUS FORMS	12- 26	23 3/8	-1 3/8	-6.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
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